

AIRPOWER IN MOUNTAINS

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ABSTRACT

This paper explores a neglected facet of the study of airpower; its relationship with mountainous terrain. Land forces have had thousands of years of experience to draw their lessons, and so are well versed with the effects of mountains. Air Forces only have a century of experience. The paper studies this century of experience in one geographical area, the Hindu Kush, through the experiences of three states wielding airpower: Britain, the USSR and the United States. This paper studies the similarities of the three experiences to draw inferences and discern patterns. The starting point of the study is the limitations faced by land forces operating in mountains. Altitude, mountain weather, and terrain adversely affect airpower, but the relevance of airpower in mountains clearly emerges only when one first appreciates the limitations of land forces. The thirty-year British experience in India saw airpower increase in capability from infancy to adulthood. Airpower made a bid for independent action before settling down to joint operations with the army. The nine-year Soviet occupation shows high reliance on airpower from the beginning, used in joint operations with land forces, especially in techniques like air assault. The US experience shows the heavy strategic reliance on airpower, as well as a reliance of airpower on ground forces to achieve its own objectives. The evidence is analyzed in two ways. First, the theoretical lens of Colin Gray's advantages and disadvantages of airpower is used to see the effect that mountains have on the use of airpower. Second, the common patterns in each campaign are traced in order to see which roles of airpower stand out in mountains. The patterns show that militaries instinctively turned to airpower to provide the mobility that the mountains impede. While airpower provided this mobility from the beginning, its performance in delivering firepower to the battlefield was not as good. Amongst the plethora of limitations that mountains impose, difficulties in target acquisition and weapon delivery have only gradually improved over the last century. The improvement has been possible due both to technology and improved joint operations, something the mountains demand. The roles of CAS, interdiction, reconnaissance, and supply grow in importance while others such as strategic bombing and suppression of air defenses reduce. The lessons of aerial warfare in mountains have ramifications for how both land and air forces need to organize, train, and equip to prosecute joint warfare. Both have to acknowledge that a different synergy is required, and individual and joint doctrines need to incorporate this fact.

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INTRODUCTION

Airpower operates in a domain clearly distinguishable from the sea, the land, and space. Generally, the theories of airpower do not comment on how its application is affected by other domains. Specifically, airpower's practitioners rarely comment on changes required in the utilization of in different types of terrain. More importantly, its practitioners do not cater to these differences. But domain characteristics matter. Armies are only too cognizant of the effects of terrain.

Airpower, too, is affected by terrain. It matters both in terms of the terrain from which aircraft operate and the terrain over which aircraft carry out operations. Airpower application is affected differently by jungles, deserts, mountains and even plains. Lessons learned in colonial policing taught the British that "the aeroplane did not entirely erode all physical obstacles to military action."¹ This paper delves into the application of airpower in one specific type of terrain – mountains, and seeks to answer the question: How do mountains affect the application of airpower?

The question arose in my mind from personal experience. India experienced its last armed conflict in 1999 in the high reaches of the Himalayan ranges. I participated as a junior military pilot on the Indian side. Seeing the war from a tactical perspective, I realized that the execution of this conflict in some of the most mountainous terrain on the planet differed radically from the type of combat for which I had trained.

In searching for the answers I have chosen the case studies of operations in the Hindu Kush, the mountains of Afghanistan and the bordering regions of British India, now a part of Pakistan. Focusing on this region has the advantage of being able to study the application of airpower from 1914 to date, starting with Britain, through the Soviet Union to the most recent operations of the United States. The British presence in the region dates back to the nineteenth century. The British experience shows the change that airpower brought from its introduction in 1914. Their thirty- year experience, lasting until 1947, shows airpower's initial evolution in this region. The nine-year Soviet experience in Afghanistan, starting in 1979, provides evidence from the Cold War era. The experience of the United States in 2002 provides the latest evidence.

¹ David E. Omissi, *Airpower and Colonial Control*, (Manchester: Manchester University Press, 1990), p. 106. His chapter "The Geographical Environment of Air Policing" describes the varied environments.

There are advantages and disadvantages to the selection of this region. The advantage of choosing the same region for three different studies is continuity on one side of the equation against which airpower's evolution can be compared over almost a century. The disadvantage is in the type of warfare examined. The nature of each state's adversary has remained largely constant in these three cases, both in terms of terrain as well as the people involved. All three case studies are examples of asymmetric irregular war, and so do not provide evidence of symmetric warfare in mountains, except by extrapolation.

All three cases provide two kinds of examples. First, the use of airpower in pitched battles and second, its use in exercising control or policing a geographic region, which today is known as Counterinsurgency (COIN). I have chosen to concentrate on the former while not totally neglecting the latter. The organization of the individual case studies, especially the selection of battles as specific examples, reflects this choice. Not described in detail, but interspersed as corollary anecdotes, are examples from the Kargil conflict. I chose not to include this conflict as a formal case study because it was only a two month conflict, while the others spanned decades. Yet, in some ways it, too, is representative of the surprise that mountains spring on the unprepared, requiring a steep and merciless learning curve. I have mentally compared every result that emerges from the historical aspects of this study to test against my own Kargil experience.

The organization of the paper mirrors the research process. Chapter 1 lays out the tactical difficulties and peculiarities of airpower application in mountains. It also represents the sum of my tactical experience and knowledge prior to this research project. Chapter 2 explains the difficulties encountered by land forces in mountains, an essential piece of knowledge in understanding why airpower plays such a crucial role in mountains. Chapter 3 shows specific case studies from the British experience. The period being large, I have selected three vignettes which best represent the evolution of airpower's use in the region. Each of the three detailed studies falls in a separate decade, from the 1910s to the 1930s. Chapter 4 captures the Soviet experience. The two specific battles chosen in this era, both in the same valley and against the same adversary, exemplify the learning curve of the Soviet experience. Chapter 5 describes Operation Enduring Freedom (OEF) and, while also touching on more recent experience, wraps up with the more historical Operation Anaconda. Chapter 6 analyses these experiences in three ways. First, it shows how the advantages and disadvantages of airpower are affected by

mountains. It does this through the lens of theorist Colin Grey, who has written about airpower's advantages and disadvantages. Second, it matches the common patterns from this century of experience, in terms of strategy evolution, and the relative importance of the specific roles of airpower. Last, it comments on the ramifications of equipment, doctrine and training specific to air power in mountains. Chapter 7 concludes with a summary and implications.

While the answer to the question posed at the beginning of this chapter is descriptive, and emerges in the analysis chapter, the process also ended up answering another question - What has been the role of airpower in mountain operations?

In all three case studies, militaries have turned to airpower as a solution to overcome restrictions imposed by terrain on land forces. In all three cases, the employment of airpower has gravitated towards joint operations in general, and within that, Close Air Support (CAS) in particular. From the beginning, while airpower provided the *mobility* that mountains took away from land forces, it lacked the ability to deliver accurate *firepower*, falling short of expectations. Evolving technology has kept increasing accuracy in the delivery of air to ground munitions such that today airpower can provide both *mobility* and *firepower*, but in mountainous terrain, it is effective only when employed *jointly* with land forces.

The next chapter explains the tactical and operational limitations that mountains impose on airpower.

CHAPTER 1

THE EFFECT OF MOUNTAINS ON FLYING OPERATIONS

Introduction

Heavier than air aviation started in 1903 by launching an aircraft a few feet over plain ground, close to sea level. By the closing years of the century fixed-wing aircraft were flying thousands of feet above sea level and in varied terrain. However, the difficulties for aviation are compounded when aircraft have to fly above very high terrain. This chapter explains the peculiarities of altitude, mountain weather, and terrain on flying operations in mountains, and thus addresses the operational and tactical ramifications of the three.

Altitude of Operations

The most important physical change affecting high-altitude flying is a reduction in air density. This reduction in density has two ramifications on aircraft. First, it reduces the thrust produced by aircraft engines.¹ It also affects the stability of jet engines, making them prone to compressor blade stall and surge. Second, it reduces the aerodynamic performance of all aircraft. For fixed-wing aircraft, responsiveness and controllability is reduced, while the actual speed of travel through the air increases with altitude². Aircraft describe a larger path for all maneuvers; whether it is horizontal turn radii or increased height lost in a pullout from a dive. For helicopters, rotor tip speed starts to approach the limiting speed of sound, a barrier not yet surmounted by existing technology. This limits the forward speed of the helicopter as well as rotor rpms. In combination, a reduction of thrust and maneuverability limits the operating ceiling of underpowered aircraft, reduces the payload that can be lifted from high altitude terrain and increases runway length requirements. If temperatures increase, all these problems are further exacerbated.

High altitude operations also affect air-to-ground weapon performance. Most weapons are designed for low and medium-altitude firing/dropping. Their ballistic tables start to deviate

¹Federal Aviation Administration, *Pilot's Handbook of Aeronautical Knowledge*, (New York: Skyhorse Publishing, 2009), p.6-22 to 6-23.

² In aerodynamic terms the True Air Speed (TAS) which is physical travel speed, increases, while the cockpit indicated airspeed, which is a measure of responsiveness, for a constant TAS, reduces with increase in altitude.

from actual performance, especially at longer ranges. While this phenomenon is more prevalent in unguided munitions, guided munitions are not immune when targets themselves are at high altitude. This is because precision munitions such as Laser Guided Bombs (LGBs) also use aerodynamic surfaces to fly through the rarified air. Due to the lesser drag of air at high altitudes, unguided munitions tend to overshoot aim points while the precision munitions tend to have more trajectory inertia resulting in increased Circular Error Probable (CEPs).³ This in turn not only affects results, but the location of the Fire Support Coordination Line (FSCL). Thus, at higher altitudes, the distance between the target and friendly forces needs to be increased.

Another ramification of altitude on weapons is the restrictive weapon delivery envelope of the mother aircraft. Most air-to-ground weapons can only be delivered at subsonic speeds. As aircraft fly higher, they start to fly closer to the speed of sound, and so need to fly a slower Indicated Air Speed (IAS) to avoid going supersonic.⁴ However, weapons also have a safety based minimum IAS at which they can be launched or dropped. As the aircraft fly higher, they start approaching the maximum Mach number permissible, while simultaneously approaching minimum IAS limits.⁵ In effect, the higher you fly, the more restrictive becomes the weapon delivery envelope, with a very narrow speed window. Coupled with reduced thrust and maneuverability, the skill level required to deliver the weapons increases from the relatively carefree handling possible at lower altitudes. For example, in the Kargil conflict, a Mig-27 was lost due to firing rockets “out of envelope”, leading to an engine flame out.⁶

³Captain Marcus P. Acosta, “High Altitude Warfare: The Kargil Conflict And The Future,” (Monterey, Cal: Naval Postgraduate School, 2003), pp. 15-16, at <http://www.nps.edu/Academics/Centers/ccr/Research/.../Acosta.pdf>, accessed 21 Dec 2011. The author cites from U.S. Army Field Manual 23-10, *Sniper Training* (Washington, D.C.: U.S. Government Printing Office, 17 August 1994), 3-27. While he talks about artillery and bullets, the same aerodynamics apply to bombs, rockets and cannon. With precision munitions, the older generation of control laws use “bang-bang” controls, in which control surfaces on weapons deflect fully to correct its flight path, leading to more maneuvering around the mean path. Later generation “proportional control” surfaces maneuver the weapons more gently and precisely, reducing energy loss in the process.

⁴ IAS is roughly a measure of the air pressure acting on the aircraft due to its speed. It affects how the aircraft and its control surfaces respond, and so controls maneuverability.

⁵ Mach number is a ratio of True airspeed to local speed of sound. A Mach number of one implies that an aircraft is flying at the speed of sound.

⁶ Air Chief Marshal A. Y. Tipnis (ret.), “Operation Safed Sagar,” *Force*, October 2006, p. 14. at <http://www.forceindia.net/ACM%20Tipnis.pdf>, accessed 21 Dec 2011.

Mountain Weather

The weather in mountains has its own peculiarities, which affects aviation. First, both mountain slopes as well as valley floors are prone to fog. These two types of fog are called Upslope fog and Radiation fog respectively.⁷ Valley fog is a type of Radiation fog that tends to form at night and dissipates under the morning sun. Upslope fog forms on the sides of the mountains and is more prevalent in winters.⁸ Both types affect surface visibility. As the French realized in Vietnam, “The weather...was often very different over the Delta airfields and the High Region; morning fog in the hills was a constant problem, and the Army must not expect uninterrupted air support.”⁹

Second, whenever moisture is present, the mountain ranges are prone to the formation of cumulus clouds in the afternoon hours. At a minimum, they affect visibility, and at worst, thunderstorms preclude flying altogether. The Royal Air Force was the first to discover the implications of this pattern for military aviation, “Along the North West Frontier visibility could be reduced from 100 miles to 100 feet in five minutes if the clouds suddenly shut down the mountains. During operations against the Shabi Khel in August 1924, for instance some pilots were gradually forced lower and lower by descending cloud. They attempted to escape by chasing the contours of the valleys, until eventually the wet, opaque greyness closed in completely and the aircraft flew into the hillsides. Although the aeroplane extended the reach of the state into mountainous areas, this reach was heavily qualified by unfavorable weather.”¹⁰

Third, a phenomenon called Mountain Wave Turbulence can cause severe turbulence and even break up aircraft in extreme cases. This turbulence originates at mountain crests but can propagate several miles away, where it can continue to affect aircraft. Airflow in and around mountains is peculiar and can cause downdrafts of more than 8000 feet per second, which is beyond the climb rates of some aircraft, especially at the reduced thrusts available at high

⁷ Lt Col. Gene Guerny and Capt. Joseph A. Skiera, *Pilot's Handbook of Weather*, 2nd ed., revised by L. W. Reithmaier, (Fallbrook CA: Aero Publishers Inc, 1974), p. 108. Upslope fog is formed by moist air which cools because of expansion as it moves upslope. Radiation fog is formed by moist air in contact with earth's surface which cools at night due radiation.

⁸ <http://www.crh.noaa.gov/jkl/?n=fogtypes> accessed 01 Jan 2012.

⁹ Martin Windrow, *The Last Valley*, (Cambridge, MA: De Capo Press, 2004), p.226.

¹⁰ Omissi, *Air Power and Colonial Control*, p. 99.

altitude.¹¹ The RAF again learnt these lessons the hard way, “It could be fatal to misjudge air currents. Stanley Vincent recalled how one officer, while making a farewell tour of Kurdistan, attempted to fly low over a ridge to impress his passenger. The wind was from the other side, the aircraft was sucked down by the descending current and dashed to splinters against the almost vertical cliff face. Both pilot and passenger were instantly killed.”¹² As Omissi describes the effect of weather in Afghanistan in 1919, “Operations over the mountains along the frontier with Afghanistan were almost constantly hampered by inclement weather. ...Although the weather was otherwise mild for the season, the atmospheric conditions over the hill country were very hazardous and aeroplanes were badly buffeted when crossing into Afghan territory. On one occasion two machines were thrown upside down as they flew along the Khyber Pass. As the weather became hotter, the turbulence increased, and by mid-May it was impossible to take off after 9:30 am; this greatly reduced flying hours.”¹³ Additionally, snowfall in winters causes a phenomenon called whiteout, where depth perception is lost and is especially dangerous to helicopters trying to fly within valleys and attempting to make a landing in featureless terrain. Together, all weather phenomena put limits on operations in mountains. Weather not only affects flying operations but also target acquisition, weapon delivery, and reconnaissance.

Terrain

Mountains have been traditionally inhospitable regions largely untouched by development. The population density in mountainous regions tends to be low. Lack of easily arable land is one reason. Connectivity, both due to terrain and, to some extent, as a result of low population density itself, is the other reason. Strategic targets are rare, being limited to the few available urban centers. Railways are rare, and roads are also limited. This reduces the type and size of targets available for air strikes. Military targets tend to be small and dispersed, and blend well with the terrain, becoming difficult to acquire, especially if aircraft fly at high altitude.

All mountainous terrain is not the same; it varies from shallow hills to massive mountains, from desert landscapes to wooded slopes to craggy and barren boulder strewn slopes.

¹¹ <http://www.atsb.gov.au/publications/2005/mountain-wave-turbulence.aspx> accessed 01 Jan 2012. In the case of a loss of a Cessna 206 in 1996, the investigation concluded, “it is probable that the maximum climb performance of the aircraft was not capable of overcoming the strong downdraft at the time.”

¹² Omissi, *Air Power and Colonial Control*, p. 99.

¹³ Omissi, *Air Power and Colonial Control*, pp. 9-10.

Combined with a lack of large target systems, this makes target acquisition by fast flying aircraft an extremely difficult process. While land forces are more affected, in being unable to look across the next hill, aviators too, find their bird's eye view severely curtailed by terrain. The Russians identified four specific difficulties imposed by terrain on ground attack aircraft – “navigation to target area, selection of best approach for the attack, accurate location of target and selection of the most suitable munitions.”¹⁴

First, navigation tended to be problematic for older generation aircraft without electronic navigational aids and is largely reduced by current IN – GPS (Inertial Navigation – Global Positioning System) aids. However, despite these aids, for aircraft flying at low levels inside valleys with high mountains on either side, a turn into a wrong valley can be fatal, if horizontal maneuvering space or enough thrust to clear the vertical obstructions is insufficient.

Second, the problem of best approach direction for attack remains. The tactical considerations affect both conventional as well as precision munitions. These considerations arise from the vertical nature of the ground, both where the targets are located as well as surrounding slopes. In the case of conventional weapons, such as rockets and bombs, while targets on valley floors are easier to attack, especially along valley orientation, the ones on slopes present increased problems. These entail cross-valley attacks, where line of sight (LOS) between attack aircraft and targets occurs late, due to intervening ridges. Coupled with small target size, this translates to either delayed or failed acquisition of targets, or in some cases, a very steep dive angle after acquisition. Since height loss in dive recovery is larger in mountains, steep dive angles allow very little tracking times before pullout needs to be initiated, the end result being increased errors.

Precision Guided Munitions (PGM) delivery entails its own pitfalls, especially against vertical targets. Targets on vertical slopes require a very precise direction of approach by launch aircraft, and in the case of Laser Guided Bombs (LGB), constrained maneuvering by lasing aircraft (in case of airborne lasing). The lasing platform needs to ensure that it is always pointing the laser at the same face of the target, while carrying out a breakaway horizontal maneuver, and simultaneously avoid lasing the face at too shallow an angle, so as not to cause a “podium effect”

¹⁴ Scott R. McMichael, *Stumbling Bear: Soviet Military Performance in Afghanistan*, (London: Brassey's (UK) Ltd, 1991), p. 84

in which case the bomb may be unable to see the laser spot.¹⁵ Weather also adversely affects LGBs since firstly, the target has to be acquired, and secondly, the laser spot should be seen by the bomb seeker, and intervening clouds and rain can make both impossible.

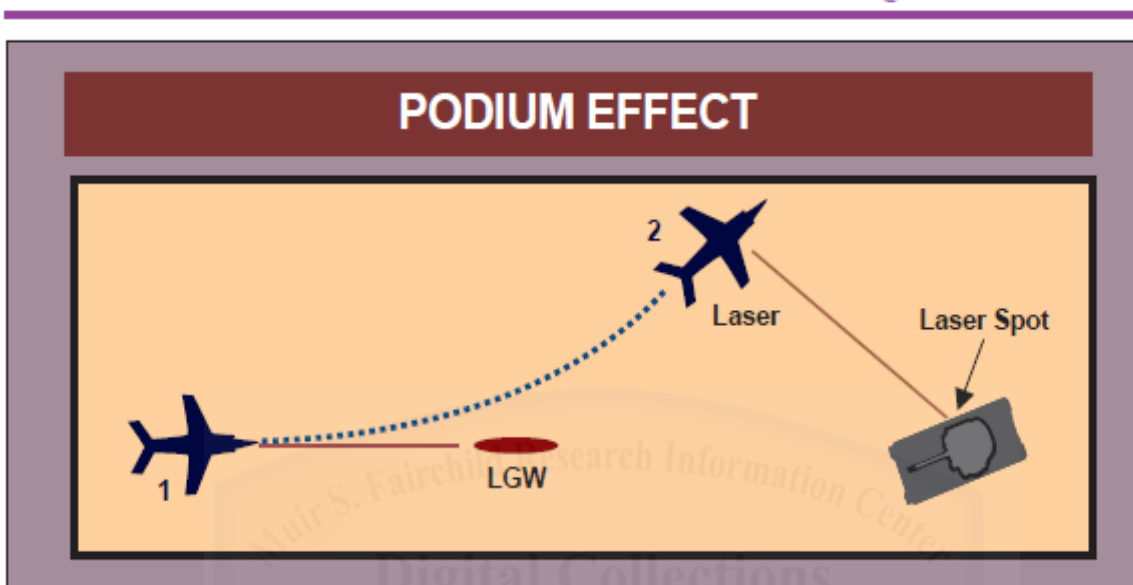


Figure 1: Podium Effect.

Source: JP3-09.1, *Joint Tactics, Techniques, and Procedures for Laser Designation Operations*

Third, the problem of accurately locating targets is also peculiar to mountains. Mountains tend to be featureless, with each range blending into the other. The Indian Air Force codenamed its part in the Kargil conflict as “Safed Sagar”.¹⁶ It means White Sea, a term representative of how aviators see the mountains, as endless waves of peaks and troughs, each wave identical to the next, as in an ocean. The vertical projections cause shadows, which create problems not just for visual acquisition but also change the thermal signature. This in turn confuses IR (Infra Red) band Forward Looking Infra Red (FLIR) sensor operators. In high mountains, these shadows can cover a large area, especially when the sun is at low azimuths. This has two effects. First, the already small and difficult-to-acquire targets can get further hidden by shadows. Second, the

¹⁵ See US Joint Chiefs of Staff Publication, JP3-09.1, *Joint Tactics, Techniques, and Procedures for Laser Designation Operations*, 28 May 1999, p. II 4, at [http://www.bits.de/NRANEU/others/jp-doctrine/jp3_09_1\(99\).pdf](http://www.bits.de/NRANEU/others/jp-doctrine/jp3_09_1(99).pdf) accessed 01 Jan 12. The diagram and accompanying explanation explains “podium effect”.

¹⁶ Air Chief Marshal A Y Tipnis (retd), “Operation Safed Sagar,” *Force*, (October 2006).

contours which a pilot uses for feature recognition get distorted, making both navigation as well as target acquisition difficult.¹⁷ Even FLIRs are affected, since shadows cause uneven cooling and heating of the ground; an IR two-dimensional image of the same mountainous area can look very different at different times of the day. Coupled with the small size of targets that blend well with the background, the curtailed bird's eye view, the problems of shifting shadows, target acquisition becomes problematic. In the case of the Russians, once they had shifted to low-level high-speed attacks, the problems of target acquisition multiplied.¹⁸

Fourth, the defensive strength of the mountains has continued to challenge the effectiveness of weapons and led to innovations and improvisations. When faced with ineffective bombing results, due to tribesmen splitting into small targets, the British innovated with "jerry can petrol bombs" to set alight crops.¹⁹ The Soviets are reported to have experimented with chemical weapons. The Indian Air Force inducted Litening targeting pods and Paveway LGB kits *after* the Kargil conflict started, and used them to good effect.²⁰ In response to the use of mountain caves by Al Qaeda, the USAF developed two earth-penetrating weapons, the AGM-86 D (an air-launched cruise missile), and the modified GBU-24 (an advanced unitary penetrator LGB with increased penetration capability). It also developed the BLU-118B hard-target thermobaric device, intended to create a high overpressure inside enemy tunnel hideouts.²¹ However, the folds of terrain, and especially caves in mountains, have continued to blunt the strength of airpower.

Caves provide the ultimate sanctuary from air power in mountains. This phenomenon is not restricted to Afghanistan. Kurdish tribesmen used caves as a sanctuary against the RAF.²² The famous Fakir of Ipi fled to an "inaccessible natural cave complex" after attacks by the RAF in Gul Zamir Kot, from where he continued his jihad.²³ Gen Giap used them for his artillery

¹⁷ This effect can be virtually simulated by Geographic Information Software, such as Google Earth.

¹⁸ Edward B. Westermann, "Limits of Soviet Airpower: The Failure of Military Coercion in Afghanistan, 1979-89," *Journal of Conflict Studies*, Vol. XIX No. 2, Fall 1999, p. 13, at <http://www.lib.unb.ca/Texts/JCS/fall99/WESTERMA.htm>, accessed 12 May 2012. The Soviets shifted to low level ingress, in response to Stingers.

¹⁹ Major Andrew Roe, "Friends in High Places: air power on the North-West Frontier of India," *RAF Air Power Review*, Volume II, No. 2, Summer 2008, p34 at <http://www.airpowerstudies.co.uk/Latest%20Air%20Power%20Review.pdf> accessed 12 May 2012.

²⁰ They had not been integrated onto the aircraft, and this process happened as the conflict unfolded.

²¹ Lambeth, *Air Power against Terror*, pp. 288-289

²² David E. Omissi, *Airpower and Colonial Control*, p. 119

²³ Andrew M. Roe, *Waging War in Waziristan: The British Struggle in the Land of Bin Laden, 1849-1947*, (Lawrence, Kansas: University Press of Kansas, 2010), p. 173.

during the siege of Dien Bien Phu, by putting his guns on the forward slopes of the hills facing the French, dug into caves and tunnels, camouflaged by foliage, a radical innovation. French air power and artillery were unable to locate or neutralize them during the ensuing battle.²⁴ In Korea, “In the fall of 1951 the Communists also built an extensive tunnel system in the mountain caves ... that were immune to air attack.”²⁵ The impregnability of the Tora Bora cave complex to air attack in Afghanistan is one of the latest examples. Not only do caves provide protection from detection and visual acquisition by aircraft, the strength of mountains sometimes proves almost impervious to technology’s latest weapons and bombs.

Mountainous terrain exacerbates the disadvantage of base dependency, especially for fixed-wing aircraft. The terrain precludes the building of airstrips for fixed-wing aircraft. While light and rugged aircraft can still take off and land from rough, unpaved airfields, modern day jet fighters require longer runways and infrastructure, both of which are difficult in the mountains. The problem was not as great in the early years of aviation, when aircraft were piston engine-powered, light, and only required small airstrips. This allowed the British to use rough airstrips during their operations in the NWFP (North West Frontier Province), substantially increasing sortie rate and airpower effectiveness.²⁶ The advent of helicopters found modern air forces adopting the same method for rotary wing helicopters. However, the problem of base dependency in mountains remains for modern day jet aircraft.

Mountain terrain also increases the vulnerability of aircraft to anti-aircraft weapons. The reason is the reduced vertical proximity between the weapon and aircraft. At worst case, the aircraft flying in a valley can be fired on from slopes above it. This vulnerability existed in the early 1900s and has claimed aircraft in all campaigns up until Operation Enduring Freedom. The RAF lost quite a few aircraft to rifle fire, both a tribute to the marksmanship of the Pashtuns, and evidence of the vulnerability of that low and slow generation of aircraft.²⁷ The Soviets fared the worst. According to one estimate “the Soviet military lost more than one hundred ground-attack aircraft and three hundred helicopters to well-hidden mujahedeen missile and anti-aircraft gun

²⁴ Windrow, *The Last Valley*, p. 291.

²⁵ Robert Jackson, *Air War Over Korea* (London: Ian Allan, 1973), p. 102, cited by Robert A. Pape, *Bombing to Win*, (Ithaca NY: Cornell University Press, 1996) p. 150 .

²⁶ H. de Watteville, *Waziristan, 1919-1920*, (London: Constable and Co Limited, 1925), p. 194.

²⁷ Watteville, *Waziristan*, p. 195. For example, three machines were lost on a single day on 14 January 1920.

teams during ten years of combat in the mountains of Afghanistan.”²⁸ In the short Kargil conflict, the Indian Air Force (IAF) lost one MiG-21, one Mi-17 and had one Canberra damaged by Stinger fire in the initial two days of operations, before it changed tactics. The record in Operation Enduring Freedom has been good for fixed wing aircraft which operated above the SAM envelope from the outset, however, in Operation Anaconda alone, one Chinook was shot down, with another Chinook and seven other Apaches badly damaged by ground fire.

Conclusion

Altitude, weather and terrain impose tactical and operational constraints on airpower in mountains. High altitude reduces aircraft aerodynamic and engine performance. It also affects weapon accuracy and narrows weapon delivery envelopes. The weather in mountains is also peculiar. Mountain weather imposes limits of timing windows, reduces safety margins, and requires additional training for aircrew. Terrain imposes difficulties on target acquisition, reduces safety margins, makes navigation difficult, and imposes additional difficulties on weapon delivery.

With this background of a plethora of tactical and operational limitations that altitude, weather and terrain impose on airpower in mountains, it would appear that mountains are unsuited for air operations. This statement would have been true except for the fact that when we see the limitations that land forces have to work under, the limitations on air forces pale by comparison. Since this thesis is about airpower, only a short description of land limitations is discussed in the next chapter, primarily to enable understanding of the strategic and operational role of airpower in the totality of military operations in mountains.

²⁸General Mohammad Yahya Nawroz and Lester W. Grau, “The Soviet War in Afghanistan: History and Harbinger of Future War?,” *Foreign Military Studies Office*, Fort Leavenworth, Kansas, 1995, at <http://call.army.mil/fmso/fmsopubs/issues/waraf.htm>. cited by Acosta, “High Altitude Warfare,” p. 21.

CHAPTER 2

THE EFFECT OF MOUNTAINS ON LAND OPERATIONS

Introduction

This chapter explains the effect of mountains on landed armies at two levels. First, it starts at the lowest level, the individual soldier and shows how human performance suffers due to mountains. Second, it comments on operational-level difficulties. Last, it takes the theoretical lens of Clausewitz to show the strategic effects of mountains on offense and defense. This chapter is deliberately concise, yet essential to understanding the role of airpower in mountains within the whole of force application.

Limitations on Land Operations

At the lowest, and possibly most important, level, mountains physically affect the all-important soldier. Lack of oxygen combined with cold weather cause a host of illnesses and physiological effects. These include hypoxia, acute mountain sickness, high altitude pulmonary edema, cerebral edema, sunburn, blindness, and frostbite. The best way to prevent altitude sickness is to have gradual acclimatization by ascent in stages, which can take up 10 days or more, depending on final altitude and initial fitness. As Acosta records, rapid deployment severely affected the Indian Army's fighting capability during the 1962 Sino-Indian War. There is loss of aerobic capacity, and muscular weakness, as well as a reduction in night vision. Even after acclimatization, the end result is a reduced capacity to carry out fighting functions; the higher the altitude more severe the impairment.¹

Mountainous terrain affects armies in many ways. First, and most important, it restricts movement. It slows down soldiers especially when they carry heavy loads. Nor can artillery be sited or moved easily. Second, it provides hiding places for the enemy and masks the effects of firepower. Third, it affects machines and weapon systems adversely. Mountains increase ordinance ricochet effects and reduce machine gun coverage area. Fourth, logistics problems

¹ Acosta, "High Altitude Warfare," pp. 12-15. The description in this paragraph is condensed from his thesis.

multiply from increased requirements and difficulty levels.² The army cannot live off the land and mountains increase the problem of replenishment. This effect at lower levels translates to exponential difficulties at the operational and strategic level. It limits the size of forces that can be sustained and wielded in mountains. Forces are forced to divide into smaller components. As van Creveld says, “Commanders from the earliest times on had often hit upon the idea of dividing their forces in mountainous country.”³ Landed forces have realized these difficulties from ancient times. Mountain warfare is a subject of sufficient importance for Clausewitz to devote four chapters to it in his *On War*.

Clausewitz on Mountains

Clausewitz has devoted the larger portion of his theory on mountain warfare to the realm of defense. He attributes this to the retarding effect of mountains on operations. He starts from tactics and builds up to strategy. While popular opinion assumes that mountains increase the strength of defense, Clausewitz claims the opposite, saying:

Mountains are generally unsuited to defensive warfare, from the point of view of both tactics and strategy. Defense, in this sense, is of the decisive kind that determines the question of possession of the country. Mountains reduce one’s control, and impede movement in all directions; they impose passivity, and, by requiring every means of access to be blocked, they almost always lead to some degree of cordon-warfare.⁴

It is important to note the context in which he wrote – with the background of the clash of large armies in mind. But he also comments on their suitability for minor operations, where they provide great strength, “a true refuge for the weak—for those no longer able to seek an absolute decision.”⁵ He also explains the reason why “insurrection thrives in mountains” and how mountains are suited for short-term defense, or “any disposition in which one does not intend to accept a major engagement, because in the mountains each unit is strong individually; only their aggregate strength will be less.”⁶

² Acosta, “High Altitude Warfare,” pp. 18-20.

³ Martin van Creveld, *Command in War*, (Cambridge, Massachusetts, Harvard University Press, 1985), p.60.

⁴ Carl Von Clausewitz, *On War*, edited and translated by Michael Howard and Peter Paret, (Princeton: Princeton University Press, 1989), p. 427.

⁵ Clausewitz, *On War*, p. 427.

⁶ Clausewitz, *On War*, p. 424.

Mountains strengthen point defense but weaken area defense. Because point defense is strengthened tremendously by mountains, people assume that mountains increase total defense.⁷ But as Clausewitz explains, it is mobility that is the decisive factor. Mountain posts tend to be strong, but immobile. Thus, they can no longer provide mutual support to adjoining posts, and defenses invariably form a cordon. Mobility of the attackers allows them to mass strength against weak points of the cordon, while immobility of the defenses precludes concentration at decisive points.⁸ If the mobility roles are reversed, so will be the result. Even Jomini, while disparaging Clausewitz, echoes similar views, “that if a country covered with high mountains be favorable for defense in a tactical point of view, it is different in a strategic sense, because it necessitates a division of the troops. This can only be remedied by giving them greater mobility and by passing often to the offensive.”⁹

One of the contentions of this thesis is that, despite the difficulties imposed by mountains on airpower application, it is the characteristics of mobility and ability to concentrate fire at a place of one's choosing that can have a decisive effect in mountain warfare.

Conclusion

Land forces are well conversant with the limitations of mountains. All levels of the army, from the all-important foot soldier to the strategist, whether in the form of staff or the commander, are aware of the power of the mountains. Men need acclimatization to adapt, with its attendant time penalty. Weapon performance and logistics limitations contribute to units being smaller with reduced mutual support. Theorists have written on the subject. The biggest effect that mountains have is retardation of mobility.

To study evolution of anything needs the long view, not in the future but the past. Students of land forces have thousands of years of conflict in every scenario possible from which they can sample their case studies. Aviation has little more than a century of history. Within this droplet of time it is difficult to find evidence in terms of the right samples which meets the study criteria. The mountains of the Hindu Kush do provide the earliest evolutionary evidence of

⁷ Clausewitz, *On War*, p. 423.

⁸ Clausewitz, *On War*, pp. 417-419.

⁹ Antoine-Henri, Baron de Jomini, *The Art of War*, translated by Capt G. H. Mendell and Lt. W. P. Craighill, (Philadelphia: J. B. Lippincott & Co., 1862; New York: Dover Publications, 2007), Citations refer to 2007 edition. p. 151.

conflict in mountains where airpower has been used. This British introduction of airpower to mountain warfare is part of a larger story where airpower was discovering its own roles and capabilities. In charting airpower's evolution Van Creveld says, "By 1916-1917, aircraft were being categorized into different types, such as reconnaissance, fighters, close support aircraft (with armor under the front of the body), light bombers, and even heavy bombers capable of carrying a large load deep into enemy territory."¹⁰ In the mountains, exactly in this time frame, airpower discovered not only its capabilities but also its limitations. And it optimized itself in this discourse between the thesis and antithesis. The next chapter first describes the terrain in which the case studies occurred, followed by the introduction and evolution of airpower in mountains.



¹⁰ Martin van Creveld, "The Rise and Fall of Airpower," in *A History of Air Warfare*, ed. John Andreas Olsen, (Washington D.C.: Potomac Books Inc., 2010), p. 352.

CHAPTER 3

THE BRITISH IN INDIA

The experience of this training gives added reason to believe that, with further combined training of troops on the ground and aircraft in the air, close support in mountain warfare may be very effective in helping to overcome opposition, in reducing casualties to our own troops and in helping to speed up their movement.

Sir John Slessor

Introduction

The British experience of airpower usage in mountains in the NWFP and Waziristan is unique in two respects. First, it marks the origins of airpower usage in mountains, whose effectiveness can be readily gauged by the impact it had on military doctrine of the pre-airpower era. The British were already experienced in mountain operations; airpower was the new tool. Second, theirs is the longest experience, stretching from 1916 to 1947, a period of more than 30 years, and therefore suited for a study of long-term evolution.

This chapter starts by showing the impact of the arrival of airpower in the mountainous North Western region of India. It then traces its path through three case studies. The first describes its effect during conventional warfare in mountains, through the Third Anglo-Afghan War. The second study, Pink's War, marks the only recorded successful independent usage of airpower utilizing Air Control policy in a mountainous region. The third study, the Waziristan campaign of 1936-37, represents the advent of a joint air-land doctrine which lasted till the British left in 1947. It shows the doctrinal progress of airpower in mountains, from its infancy to a bid for airpower-centric operations until it settled on combined arms operations. However, before commencing on this study, this chapter offers a short description of the terrain of the region.

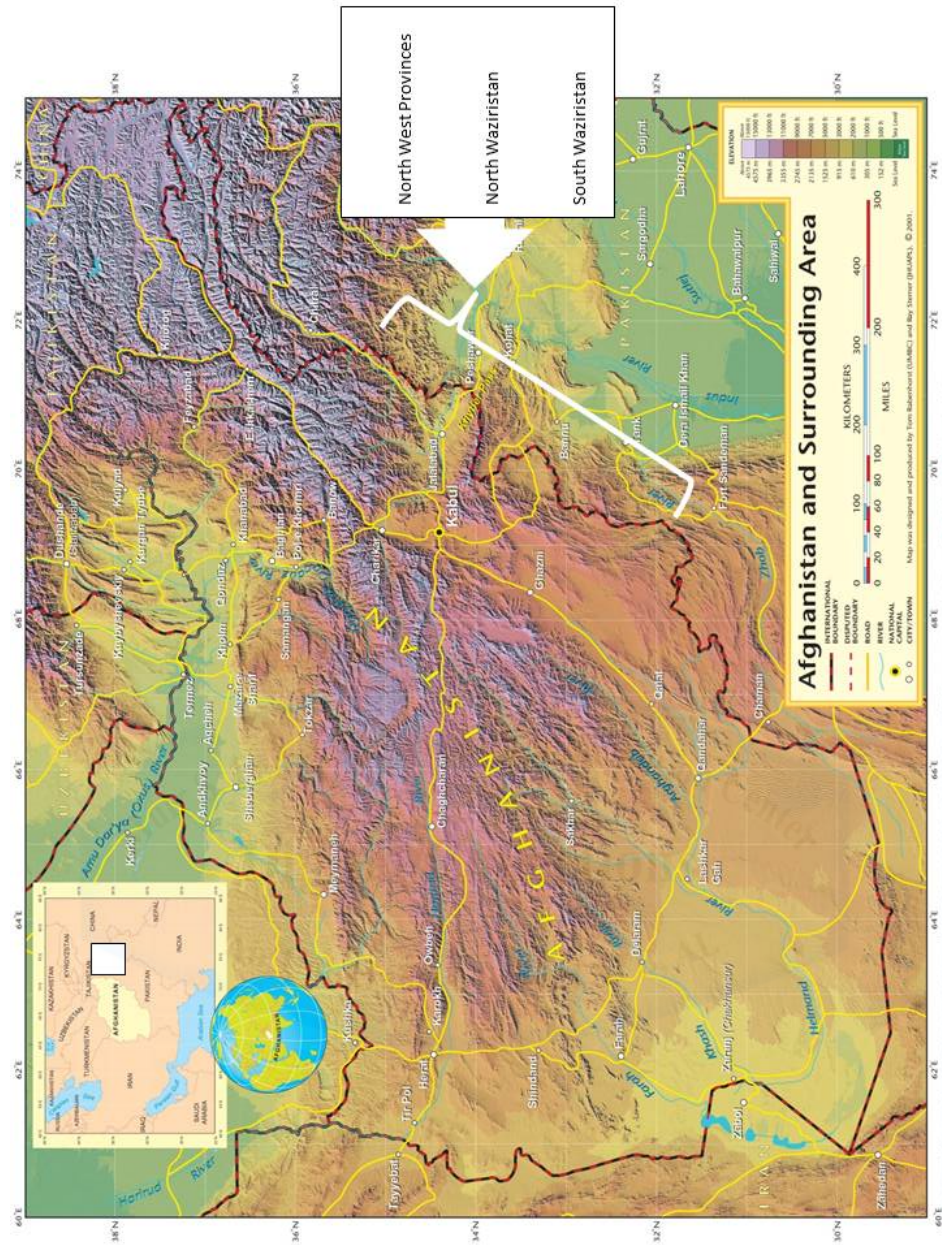


Figure 2: Topographic and Political Map of Afghanistan, NWFP and Waziristan

Source: Adapted from http://fermi.jhuapl.edu/maps/afghanistan/Afghanistan_1b.jpg

Terrain: Afghanistan, North West Frontier Province(NWFP) and Waziristan

Afghanistan is 1,240 kilometers (770 miles) wide in an east–west orientation at its widest point and 565 kilometers (350 miles) from north to south. The mountains of this region are oriented southwest to northeast. The Hindu Kush is the major component range. The average elevation of the range is 4,500 meters. The highest peaks are in the eastern provinces of Afghanistan, with altitudes exceeding 7000 meters (21,700 feet). The elevation diminishes towards the west. The west and southwest have desert and desert plateaus. In the extreme north, the mountains diminish into rugged foothills. It has various passes leading into Pakistan, the most famous is the Khyber Pass at an elevation of 1027 meters. Of the total land area more than 50 percent lies above 2000 meters (6,200 feet) elevation.¹

The North West Frontier in today's Pakistan, is slightly over 700 miles in length, with widths varying between 60 and 280 miles. In the far north at Chitral, the Hindu Kush Mountains dominate the landscape. South of the Chitral, are cultivable valleys interspaced between the 15,000 to 22,000 feet high mountains. South of the Khyber Pass are masses of cultivable valleys and hills. Further south lays Waziristan, with wooded scrub covered peaks, in the shadow of the Sulaiman Mountain Range, with four major mountain passes.²

Background

The British influence in the Afghanistan-India border region extended from the 1830s till the independence of India/Pakistan in 1947. From the late 1840s, the British followed a *closed border* policy in the North Western Frontier region – a policy of non-interference in tribal territory.³ Devoid of economic value, the region, including the kingdom of Afghanistan, was seen as a buffer between Russia and British India. The British fought three wars with Afghanistan “, the British invasions of Afghanistan in 1838 (the First Anglo-Afghan War) and 1878 (the Second Anglo-Afghan War) were simulated by the fears of Russian imperial expansion from central Asia through Afghanistan into India.”⁴ One result of the second British invasion of Afghanistan in 1878 was a switch to a *forward policy* in British held areas. It was

¹ This description is taken from McMichael, *Stumbling Bear*, pp. 18-20.

² Matt M. Matthews, *An Ever Present Danger*, (Fort Leavenworth, Kansas: CSI Press, 2010), p. 10.

³ Alan Warren, *Waziristan, The Faqir of Ipi, and the Indian Army: The North West Frontier Revolt of 1936-37*, (Karachi: Oxford University Press, 2000), p.1.

⁴ Andrew M. Roe, *Waging War in Waziristan: The British Struggle in the Land of Bin Laden, 1849-1947*, (Lawrence, Kansas: University Press of Kansas, 2010), p. 2.

conceptualized before the war by a strategic committee and adopted after the war. “The committee recommended that if Russia were to intervene in Afghanistan the Indian Army should advance into central Afghanistan to oppose it ... Once this decision was made it became imperative to hold starting positions as far forward as possible.”⁵ Thus the independent tribes occupying the entire frontier with Afghanistan came under increasing attempts at British control.

The British followed a carrot-and-stick policy to govern these regions. This included “distribution of allowances to sympathetic *maliks* (tribal representatives or elders), and by the employment of locally recruited *kassadar* (tribal policemen) and indigenous forces, known as scouts ... only *in extremis*, when outbreaks were too excessive to be contained by scouts, would the political authorities call on the army to conduct a punitive expedition in order to administer punishment.”⁶ The ruggedness of the terrain prevented a permanent presence in remote mountainous areas, and the stick was wielded in a pure punishment strategy, through punitive expeditions of the army. The “butcher and bolt” operations often included the destruction of Pashtun villages, crops, concealed provisions, and supplies of water.⁷ As Sir John Slessor explains, “Before the coming of the aeroplane there was only one method of applying armed force when diplomatic or political measures or the threat of forces had failed, and that was to kill people- to occupy their country temporarily or permanently by soldiers on the ground and to kill them if they resisted.”⁸ The arrival of airpower was to affect this strategy.

The Arrival of Air Power

Airpower arrived in a small quantity, gradually impacting the style of operations. A small detachment of the Royal Flying Corps, consisting of five Bristol fighters, arrived in India in late 1914.⁹ Airpower began to be used on the frontier in 1916, gradually growing in importance. However, “It was not until the 1919-20 campaign that airpower emerged as an indispensable component of all future operations. Such was the physical and psychological impact of aircraft in

⁵ Warren, *Waziristan*, p. 2.

⁶ Major Andrew Roe, “Friends in High Places: air power on the North-West Frontier of India,” *RAF Air Power Review*, Volume II, No. 2, Summer 2008, p. 31 at <http://www.airpowerstudies.co.uk/Latest%20Air%20Power%20Review.pdf>.

⁷ Mathews, *An Ever present Danger*, p. 19.

⁸ Marshal of The Royal Air Force Sir John Slessor, *The Central Blue*, (London: Cassel and Company Limited, 1956), p. 54.

⁹ Edgar O’Ballance, *Afghan Wars*, rev. ed. (London: Brassey’s, 2002), p. 60.

the early days that ground operations were postponed when weather conditions prohibited aerial support. ”¹⁰

Airpower was used in two ways. First, it was used under the policy of *Air Control*, a system of imperial policing, with origins in the *substitution* policy advocated by Trenchard and others, where ground operations were advocated to be substituted by air operations.¹¹ Slessor calls this method the “Air Method” in contrast to the “Ground Method” where, “The aeroplane and the bomb enabled us for the first time to enforce submission upon people without killing them. The object, as laid down in the old R.A.F. War Manual, was ‘interrupting the normal life of the enemy people to such an extent that a continuation of hostilities becomes intolerable’ ... Under this method small tribal wars were dealt with primarily by air action. ”¹² This was achieved by bombing and strafing not the tribesmen, but their livelihood. Through the *inverted blockade*, villages were bombed after leaflet dropping to ensure no loss of life, livestock and crops were targeted, scarce water supplies were disrupted – all to ensure that the offending tribe could no longer live in its village or work for its livelihood. This was done, not in isolation, but as part of, and in support of ongoing dialogue, which was the responsibility of the Political Officer or District Commissioner – who extracted from the tribes both a punitive fine as well as promises of desired behavior. It was thus part of a larger politico-military action.

The biggest advantages of this action stemmed from its ability to overcome the limitations of the Ground Method in the remote mountains. This point is exemplified by Slessor who explains why the Air Method could not be applied in the plains of Palestine because it “was not wild tribal country.”¹³ Air power extended the reach of the British, and did this instantaneously. Due to the promptness possible, and because of the low cost involved, airpower was used at much lower thresholds of disorder than punitive and expensive expeditions of the past. It would thus “nip these troubles in the bud and prevent those assuming serious proportions.”¹⁴ The one campaign in which this method was used to achieve independent objectives was in 1925, in what is known as Pink’s War.

¹⁰ Roe, *Friends in High places*, p. 32.

¹¹ Omissi, *Air Power and Colonial Control*, p.49. Trenchard wrote a paper in 1929 advocating that airpower alone be used to control the Frontier.

¹² Slessor, *Central Blue*, pp. 54,56.

¹³ Slessor, *Central Blue*, p. 60.

¹⁴ Slessor, *Central Blue*, p. 65.

The second way of using airpower was in support of ground operations. This was the conventional roles of “reconnaissance, artillery observation, offensive action (bombing and machine gun raids), re-supply of ammunition and supplies, delivery, demonstrations to deter rebellion, convoy protection, casualty evacuation, protection and messaging duties.”¹⁵ The results of these operations were mixed. The most successful results of airpower were obtained in the Third Anglo-Afghan War.

The Third Anglo-Afghan War 1919-1920

The Third Anglo-Afghan War commenced on 3 May 1919 when King Amanulla’s army crossed the Durand Line at the Khyber pass into NWFP. Although the movement of forces was ostensibly made to ensure that anti- British riots in Punjab did not spread over the Durand Line, the actual reason was an effort to regain control of foreign policy from the British. The British Army in India counterattacked on 9 May.¹⁶

The RAF contributed significantly to the war both in terms of participations in various battles as well as strategic effects. After a reconnaissance on 06 May, the RAF attacked the Afghan camp at Dakka, killing about 600 men. The raid coincidentally happened at a time when Afghan officers were distributing arms and supplies to Pathan tribesmen. The Pathans also took this opportunity to appropriate all the supplies, while the Afghan officers took shelter during the raid. The RAF provided close air support in the Second Battle of Bagh on 11 May. In the Battle for Dakka on 18 May, it played a crucial role in providing support to a counterattack at a critical time when British defenders were attempting to storm two dominating gun positions, resulting in an Afghan retreat. It was also of help to Brigadier Dyer’s support force in forcing Afghan General Nadir Shah withdrawing from his six-day siege of Thal. It harassed the retreating General’s forces and bombed his repositioned camp, and may have been the reason for abandonment of the camp the same night.¹⁷

¹⁵ Roe, “Friends in high places,” p. 32, citing Air Staff (India) Memorandum No.1, April 1935, tactical Methods of conducting Air Operations against tribes on the North west Province of India, B22, Royal air Force Museum, Hendon.

¹⁶Matthew W. Williams, “The British colonial experience in Waziristan and its applicability to current operations,” (Fort Leavenworth, Kansas, SAMS, 2005), p. 26.

¹⁷ O’Ballance, *Afghan Wars*, pp. 59-67.

However, its biggest contribution was in forcing the Afghan king to the negotiating table. As O'Ballance points out, "The sudden armistice was brought about largely by the RAF".¹⁸ Three repeated attacks on Jalalbad were launched from Risalpur on 17, 20, and 24 May 1919. The first caused many casualties, panic and looting by opportunistic tribesmen, while the third caught 2000 soldiers in an open parade ground. But probably the most decisive raid in affecting the Amir was one on Kabul itself, carried out by the sole serviceable Handley Page V-1500 aircraft, the biggest aircraft of the time and the only one with the range to reach Kabul, flown in from Britain especially for the job. The raid was carried out on 24 May 1919 at dawn, twenty bombs being dropped, four of which damaged the Amir's Palace and another destroying Kabul's only ammunition factory.¹⁹ It was because "the RAF instilled fear into the Amir who, having heard of British plans to bomb Berlin during the First World War, and anticipating such an RAF bombing blitz on his own capital, and other Afghan cities, decided to settle for negotiations."²⁰ The war ended on 8 Aug 1919. However, continuing tribal unrest on the Indian side, which had been incited by the Afghan Government as a deliberate strategy, was an aftermath of the struggle. This resulted in another year of campaigning by British forces. This paper does not cover this campaign, which is often grouped with the Third Afghan War.

Thus in a conventional war, RAF assets proved disproportionately effective in achieving operational and tactical objectives. The contrast becomes stark when compared to pre-airpower expeditions. Some of the older expeditions had ended in massacres, as happened to General Elphinstone's winter withdrawal of the British garrison from Kabul to Jalalabad in January 1842. Of the 16,500 strong force, consisting of 4500 soldiers and 12,000 dependents, only one Doctor Brydon survived, and that too with grievous injuries.²¹ However, in the role of air policing of mountainous areas, the ultimate results were mixed, with some operations being spectacular successes and others indeterminate in effectiveness, largely due to the limitations of air power mentioned in chapter 2. Pink's War of 1925 stands out as one of the successes.

¹⁸ O'Ballance, *Afghan Wars*, p. 67.

¹⁹ O'Ballance, *Afghan Wars*, pp. 67-68.

²⁰ O'Ballance, *Afghan Wars*, p. 71.

²¹ Matthews, *An Ever Present Danger*, pp. 11-12. He cites T A Heathcote, *The Afghan Wars 1839-1919*, (Kent, UK: Spellmount, 2003), pp. 42-43.

Pink's War

The one campaign that exemplifies the success of British airpower in the region is Pink's War, an Air Control operation carried out from 9 March to 1 May 1925. The aim of the 54-day campaign was to compel some Mahsud tribes, prominently the Abdur Rahman Khel, to agree to certain British terms. These included immediate cessation of unlawful behavior, like the kidnapping of Hindus, payment of punitive fines, and extracting a promise of good behavior. This campaign has the distinction of being the only one that solely used air power, a decision strongly advocated by the Air Officer Commanding, India, in response to a request by the Resident in Waziristan.

When the tribes did not satisfactorily respond to political overtures, the British launched an air campaign under the operational control of Wing Commander R.C.M. Pink, C.B.E., the officer commanding No.2 (India) Wing. The operational area consisted of 50-60 square miles of wild mountainous terrain, precipitous gorges and isolated small valleys, including approximately 40 targets varying in height from 3000 to 6,000 feet above sea level.²² He deployed his three available squadrons at two forward bases, Tank (Operational Headquarters) and Miramshah. Two squadrons were equipped with de Havilland D.H. 9 A's and one with Bristol F.2 B fighters. Three specific tactics were used, Intensive Air Attack, Air Blockade and limited Night Bombing. The first consisted of concentrating the efforts of all three squadrons on a particular target in a defined time period, albeit with varying timing to achieve tactical surprise. Air Blockade was imposed by bombing objectives at irregular intervals to cause intolerable inconvenience to daily life, cut off communication, and prevent cultivation of fields or grazing of livestock. Night bombing was an extension of Air Blockade to nighttime hours, practiced from 30 March onwards, by single aircraft operating by moonlight.²³ The bombing was not continuous and was stopped when the tribesmen requested a *jirga* (tribal council). The *jirgas* were also an opportunity for the political officer to announce terms and keep communications open to the elders. However, when *jirgas* failed to produce results, operations recommenced. Peace finally ensued after a *jirga* commenced on 28 April at Jandola where "After three days of prolonged and

²² Lieutenant Colonel Andrew Roe, " 'Pink's War'-Applying the Principles of Air Control to Waziristan, 9 March to 1 May 1925," in *RAF Air Power Review*, Vol 13 No 3 Autumn / Winter 2010. p. 102, at <http://www.airpowerstudies.co.uk/Apr%20vol%2013%20No%203.pdf> accessed 12 May 12. He cites C. Bowyer, *RAF Operations, 1918-38*(London: William Kimber and Co., 1988), p. 172.

²³Roe, "Pink's War", p. 110. He takes the summary of figures from E. Ellington, *The London Gazette*, supplement, 17 November 1925, 7601. Only 29 flights were made by night out of the total of 1222 for the entire campaign.

exhausting discussion, due to the conflicting interests of all parties, terms were agreed on 1 May in Jandola, with practically no ill will.”²⁴

The campaign was extraordinary for achieving remarkable results at little cost. Total human casualties were only 11 killed or wounded, caused by 154 tons of bombs and 100,000 rounds of ammunition. On the British side, one D.H. 9 A biplane was lost, probably to rifle fire, with the two crew dead. This success was in no small measure due to the manner in which the air campaign was conducted. The air campaign was conducted to avoid loss of human lives, along with the continuous political process of *jirgas*, which were actively facilitated by the British Resident.²⁵

Lessons from Pink's Campaign

This operation brings out a number of lessons pertinent to mountains. First, the campaign timing of March to April meant the weather was the worst in terms of “hot and high” performance of aircraft.²⁶ Coupled with the altitude of the targets, “This necessitated aircraft with full war-loads to limit fuel loads to approximately 60 per cent in order to attain bombing heights.”²⁷ Atmospheric turbulence affected bombing accuracy, except in the morning and evening. Afternoon thunderstorms accompanied by hail periodically affected Miramshah (at 3000 feet elevation) between 12 noon and 3 pm and often rendered the airfield unserviceable. Operations were affected on six such occasions. Wireless telecommunications between Miramshah and Tank were also affected.²⁸

Second, a lack of training and a paucity of experienced aircrew adversely affected operations. Experienced aircrew were few since most had just been rotated out of the region, and the new aircrew were unavailable “since they had not had time to complete their training under Indian conditions, which differ from those at Home on account of the low density of air and the

²⁴ Roe, “Pink’s War,” p. 108.

²⁵ Roe, “Pink’s War,” pp. 97-117. The entire campaign description of Pink’s war has been taken from this work.

²⁶ Roe, “Pink’s War,” p. 110.

²⁷ Roe, “Pink’s War,” p. 102, citing C. Bower, *RAF Operations*, p. 172 .

²⁸ Roe, “Pink’s War,” p. 117. From endnotes quoting E. Ellington, *The London Gazette*, supplement, 17 November 1925, 7597.

height of landing grounds.”²⁹ It normally took about a month of training to get used to the local conditions of frontier operations.

Third, a lack of information prolonged operations. “The R.A.F. intelligence structure and poor mapping and photographic intelligence played a major role in the extended duration of operations.”³⁰ On the positive side, it was Pink’s personal involvement which led to a master map of the region in the Headquarters with all targets carefully marked, allocated to the squadrons with Pink knowing “every inch of the map as if he had been flying over it daily for weeks.”³¹

Fourth, the aircraft technology of the era both worked for and against the British. The British were using Bristols and de Havillands, both biplanes with low speeds and rates of climb. These two factors increased the aircraft’s vulnerability. O’Ballance gives an example from the Third Afghan War which was still valid in 1925, “The RAF was using BE-2C Bristol Fighter aircraft, which had a maximum speed of 72 mph at 6,500 ft, a ceiling of 20,000 ft, and could remain airborne for about 3 1/2 hours. Due to the plane’s slow rate of climb after take-off, RAF pilots soon had the unusual experience of being shot at by Afghan rifle-fire from mountain crest-lines above them.”³² However, the slow speed and attendant small radii of maneuver also allowed these aircraft to operate inside valleys, much as helicopters and dedicated CAS aircraft of the future. The tactical unit was a flight of three aircraft normally bombing from 3000 feet above the target, something only the “low and slow” fixed wing aircraft of the era could do.³³ Often, aircraft were used as a show of force by overflying the area of operation. Being low and slow contributed to their visible presence.

Despite these limitations, the campaign succeeded. It was the remoteness of the regions targeted, which allowed the aircraft to outmaneuver the tribesmen. Against pre-airpower army expeditions, the tribesmen had been able to coalesce and disperse at will against the less-mobile British columns. As the army columns got smarter and started to use pickets as advance and rear guards, commanding the heights, the tribesmen only capitalized if the picket parties or the main columns made mistakes. At worst, the villagers could vacate the area and come back when the patience or supplies of the army dwindled and they returned back to garrison. The airpower

²⁹Roe, “Pink’s War,” p.111. He quotes J.B. Glubb, “Air and Ground Forces in Punitive Expeditions,” in *Journal of the Royal United Service Institution*, vol. LXXI (1926): 779.

³⁰ Roe, “Pink’s War,” p. 112.

³¹ Roe, “Pink’s War,” p. 103.

³² O’Ballance, *Afghan Wars*, p. 60.

³³ Roe, “Pink’s War,” p. 103.

campaign allowed no such relief or opportunity. Airpower created a sense of futility and frustration. Airpower enthusiasts maintained that because of the humane measures adopted, like warning leaflet dropping, along with the minimal loss of lives, long-lasting hatred was not created as a result of the conflict, and the British government's actions retained legitimacy. The combination of frustration, lack of spoils from raiding, the prolonged disruption of daily life, coupled with the perceived legitimacy and humaneness of the campaign, resulted in the political process's success.

The Waziristan Campaign 1936-37

Despite the success of the 1925 campaign, the idea of Air Control remained controversial, acting to exacerbate inter-service rivalry. Trenchard wanted to use the principle used in Pink's War as policy for India, but the idea was never implemented, largely due to a clash of inter-service interests. Instead the role of the RAF in operations gradually increased in the next decade.³⁴

Army-Air Force cooperation gradually increased, resulting in synergy by the mid-1930s. This also caused a shift away from the Air Control policy towards joint operations. The appointment of Air Marshal Edgar Ludlow-Hewitt as AOC India in March 1935 "meant the RAF also took a greater interest in tactical co-operation with army in mountain warfare during 1930s."³⁵ This coincided with Wing Commander Slessor's (CO No. 3 Indian Wing) conviction that the "Aldershot Model" of Close Air Support, a European model, was ineffective in mountainous terrain.³⁶ He experimented and devised new methods of ground to air communications as well as attack tactics, namely the Vickers-Bomb-Lewis (VBL) attack tactic.³⁷ The VBL was a "type of attack, in which aircraft dived on its objective using the forward Vickers guns to keep down enemy fire, dropped its bombs and then the rear-gunner sprayed the target area with the Lewis guns as protection in the otherwise rather vulnerable pull-up and get-

³⁴ Omissi, *Airpower and Colonial Control*, p. 48.

³⁵ T.R. Moreman, *The Army in India and the Development of Frontier Warfare, 1849-1947*, (London: Macmillan Press Ltd, 1998), p. 153. He cites D.J. Waldie, *Relations between the Army and the Royal Air Force*, (London, D.Phil., 1980), pp.210-110.

³⁶ Moreman, *The Army in India*, p. 153. The Aldershot Model was designed for European plains. Also as Roe explains "Popham panels or improvised visual target indication were the primary means of communication, in the case of the latter, a number of linen strips, forming an arrow head visible from the air, pointed in the direction of the attack. A system of linen bars across the tail of the arrow provided an approximation of distance. This only provided the most basic of information and was slow to erect." Roe, "Friends in high places," p. 39.

³⁷ Moreman, *The Army in India*, pp. 153-154.

away after the dive.”³⁸ He also carried out a series of joint exercises with the army in April 1935 and November 1936 to refine CAS tactics.³⁹

This investment was to prove beneficial when the Waziristan Military District was the venue of another pacification campaign. In November 1936 two army Columns, the Tochi Column (Tocol) and Razmak Column (Razcol), conducted flag marches in the Khaisora valley.⁴⁰ They were attacked by tribesmen incited by the Faquir of Ipi, and took heavy casualties. This was the start of the largest-scale fighting carried out since 1919-1924.⁴¹ The high point of the campaign was the joint army-air cooperation, “an exception after long years of acrimonious disagreement over air control.”⁴² Six squadrons equipped with Westland Wapiti, Hawker Audax and Hawker Hart, and a flight of aircraft from the new Indian Air Force were used. The air operations were again divided into independent and support operations. The independent operations had strict rules of engagement meant to be humanitarian. The humanitarian aspects included leaflet dropping before bombing and strict limits on targeting women and children. Support operations included daily photographic reconnaissance in support of army movements, casualty evacuation and air drop of supplies to columns and outposts, allowing the army to travel light.⁴³

It was the CAS tactics honed by Slessor that “were thoroughly vindicated during the Khaisora operations.”⁴⁴ The VBL tactics were extensively used. The aircraft using these tactics bombed the enemy much closer than permitted earlier.⁴⁵ In the Khaisora operation, preplanned CAS was the preferred mode and only once, on Dec 22, was emergency, or non-preplanned, CAS called upon. Slessor, however, highlights the limitations of communication and target identification in the case of emergency CAS.⁴⁶ The support aircraft were often used as flank guards or high pickets, in steep country, speeding up the army movement. A senior AF officer

³⁸ Slessor, *Central Blue*, p.125.

³⁹ Moreman, *The Army in India*, p. 153-154.

⁴⁰ Flag marches were a show of force conducted by the British army wherein a column of troops marched through a disturbed area as a symbol of the presence of government force to ensure law and order.

⁴¹ Moreman, *The Army in India*, pp. 155, 163.

⁴² Moreman, *The Army in India*, p.166.

⁴³ Moreman, *The Army in India*, p. 167.

⁴⁴ Moreman, *The Army in India*, p. 167.

⁴⁵ Slessor, *Central Blue*, pp. 122-123.

⁴⁶ Slessor, *Central Blue*, p. 656-660.

stayed with the column HQ to meet air support requirements. Slessors' insistence on communication paid dividends, with both R/T and XVT signaling systems proving useful.⁴⁷

Despite its limitations, air power assisted the army, not just in direct support, but in ultimately increasing both mobility and firepower. The army understood the importance of mobility and built roads into tribal regions, an act that was opposed by tribesmen. By 1937, the army was "more than ever dependent on roads, especially for units from the field army."⁴⁸ Increased dependence on motorized transport (MT) introduced dependence on Road Protection missions, which started to use armored vehicles. However, a clear lesson from the campaign was the enduring requirement of pickets along the routes, whether the routes were motor able or not.⁴⁹ Flank protection from the air, especially in difficult terrain, along with scouting, allowed the columns to reduce dependence on the time consuming requirement of deploying pickets. At the same time, assurance of airdrops allowed the columns to travel light. Both these measures increased the mobility of the army. Theoretically, firepower was also increased by the availability of aircraft, but this was offset by the still existing issues of target identification and bombing accuracy. Ultimately this was more a technological limitation than one of skill.

The difficulties of applying air power in the mountains, not the least being target acquisition, identification and bombing accuracy, remained. Aerial navigation was still problematic, and wrong villages were bombed by mistake. Inexperience of pilots contributed to bombing inaccuracy.⁵⁰ For example, in two days of bombing in November 1928, out of 182 bombs dropped, 102 missed their target villages.⁵¹ Accurate bombing could be occasionally accomplished, but only with a combination of experienced aircrew and low-level attacks.⁵² Intelligence did improve. "During the Frontier operations of March 1932, 1000 square miles of country was surveyed from the air and almost 12,000 photographic prints issued."⁵³

⁴⁷ Moreman, *The Army in India*, pp. 167-168. The XVT system used cloth strips on ground to form an X or V or T, with both the letter and its orientation conveying information about own and enemy troop locations to aircraft. As per Roe "The advantage of this method was its speed and simplicity." Roe, "Friends in high places," p. 40.

⁴⁸ Moreman, *The Army in India*, p. 165.

⁴⁹ Moreman *The Army in India*, p. 166.

⁵⁰ Roe, "Friends in High Places," p. 35.

⁵¹ Omissi, *Airpower and Colonial Control*, p. 166.

⁵² Omissi, *Airpower and Colonial Control*, p. 167.

⁵³ Omissi, *Airpower and Colonial Control*, p. 167.

Training

Aircrews were undertrained for three reasons. First, the rotation policy caused breaks in flying operations and a steady loss of experienced pilots. A group of fresh pilots would regularly replace the experienced ones. The journey from the UK would take two months by ship. This break in flying was addressed at Karachi. The freshly disembarked pilots would get a refresher in flying training to regain rusty skills. Subsequently, actual flying in mountainous terrain would be learnt in the squadrons, under the tutelage of the experienced pilots left. This would take up to a month.⁵⁴ Second, The RAF was badly short of aircraft and spares till the mid-1930s. When Air Vice Marshal John Salmond carried out an inspection visit in June 1922 he found that a “shortage of essential spares had ... crippled the frontline squadrons and that pilots were rapidly losing confidence.”⁵⁵ Two squadrons in Peshawar could between them produce one flight-worthy aircraft and that with a large hole in its wing. This shortage, coupled with operational requirements, would have reduced effort towards training. The third reason was an institutional failure to realize that mountain and frontier flying needed a different set of skills. This flaw was only rectified after 1935, when Air Officer Commanding India, Air Marshal Edgar Ludlow-Hewitt “issued instructions that all RAF training in the subcontinent should henceforth be directed solely towards efficiency in tribal warfare.”⁵⁶

Technology

The RAF operated with technology that was rudimentary, not just compared to today but also to what was available in Europe in the same time period. The Bristol was underpowered, had a low ceiling and endurance, and, a low rate of climb.⁵⁷ During the Third Anglo Afghan War, the Bristol did not have the range to cover the 140 mile distance between Risalpur and Kabul and so the Handley Pages had to be flown in from Britain.⁵⁸ Technology also dictated tactics. Aircraft had to come in low to bomb accurately. Coupled with the requirement of training, bombing accuracy was generally poor. Inaccuracy plagued not just bombing but supply

⁵⁴ Roe, “Pink’s War,” p. 111.

⁵⁵ Omissi, *Air Power and Colonial Control*, p. 47.

⁵⁶ Moreman, *The Army in India*, p. 153, he cites D.J. Waldie, *Relations between the Army and the Royal Air Force*, (London: D.Phil., 1980), pp.210-11.

⁵⁷ O’Ballance, *Afghan Wars*, p. 60.

⁵⁸ O’Ballance, *Afghan Wars*, p. 68.

drop, too.⁵⁹ Due to a lack of technological intelligence, the RAF relied on human intelligence.⁶⁰ Slessor correctly identified communications as one of the major constraints of air support operations. Communications methods included, message dropping, Popham Panels and cloth strips, visual signaling by semaphore and heliograph, radio telegraphy, as well as the savior of many patrols, carrier pigeons.⁶¹

Effectiveness of Air Operations

Airpower both changed the paradigm of strategy used and also itself evolved over the 30-year experience. Airpower was noticed for its effect in the Third Afghan War. It started out in support of Army operations. The roles carried out were “reconnaissance, artillery observation, offensive action (bombing and machine gun raids) sanctioned by the political agent, resupply of ammunition and supplies, delivery, demonstrations to deter rebellion, convoy protection, casualty evacuation, protection, and messaging duties.”⁶² In the mid-1920s, the advent of air policing doctrine saw instances of the use of air power without land forces. But, the successes that it achieved towards limited coercive aims were dependent on two other factors. First, the constant political dialogue by the political agent and *jirgas* was an essential complementary strategy. Second, its relatively benign use in avoiding human casualties in implementing the *reverse blockade* gave it legitimacy, even in the eyes of the targeted population. By the mid-1930s, airpower settled into its final role of support to landed forces, continuing till 1947. In this final role, its effectiveness increased as a function of numbers, technology and experience.

Conclusion

Airpower's arrival in 1914 changed the way frontier wars were fought. Despite its limitations, airpower performed well in conventional wars. It was less effective in peacekeeping. Numbers, training and technology were responsible. They were inadequate to deliver the kind of precise effects demanded of airpower. However, airpower advocates tried to convince the British

⁵⁹ Andrew M Roe, “Friends in High Places,” , *RAF Air Power Review*, Volume II Number 2 Summer 2008, p. 34-35

⁶⁰ Roe, “Friends in High Places,” p. 36, citing J B Glubb, *War in the Desert: An RAF Frontier Campaign*, (London: Hodder and Stoughton, 1960), pp. 51-66.

⁶¹ Andrew M Roe, “Friends in High Places,” p. 37-38.

⁶² Roe, *Waging War in Waziristan*, p.131, citing B22, Air Staff (India) Memorandum No.1, April 1935, “Tactical Methods of Conducting Air operations against Tribes on the North –West Frontier of India,” Royal air Force Museum, Hendon.

Government to use it as the primary arm of control. This effort was not restricted to India, but part of a bid for a worldwide *substitution* policy. It occasionally proved effective, used in operations with limited aims and coupled with political dialogue. By the 1930s, airpower practitioners finally closed the gap between independent and support operations. Its role evolved to settle on joint operations with land forces. While its performance in these roles kept improving, it was well short of what ground commanders expected. While lack of numbers reduced the amount of support the RAF provided, limitations of technology, especially bombing accuracy and communications, and insufficient training combined to reduce the precision effects of firepower in support of the army. O'Ballance sums up the state and performance of the RAF well when he says, "The tiny RAF element in India was undervalued, under-supported and under-recorded."⁶³



⁶³ O'Ballance, *Afghan Wars*, p. 71.

CHAPTER 4

THE USSR IN AFGHANISTAN

Using nap-of-the-earth flying, the helicopter pilots flew undetected to the mountainside of the strongpoints and landed the force at 0644 hours on 12 April. Mi-24 helicopter gunships supported the insertion while artillery fire closed down the enemy firing points. Simultaneously, two pair of Mi-8 MT helicopters hit the DShK heavy machine guns and the guards' barracks. The fight for the dominant heights lasted 17 minutes. Our force lost two KIA and three WIA, while the enemy, caught totally unawares, lost several dozen men.

Maj N. G. Ten'kov

Introduction

The Soviet Union occupied Afghanistan for nine years from the end of 1979 to 1989. The Soviets very quickly capitalized on the need for airpower to supplement ground forces in their implementation of military strategy in this inhospitable terrain. Eventually, airpower became the first instrument of choice, and it was only the denial of mobility due to effective Air Defense provided by the Stinger threat, that put restrictions on its application. This chapter traces the path from initial invasion to withdrawal. It also takes two specific case studies, the first and seventh battles for Panjshir Valley, to exemplify how airpower application in mountains matured by experience.

Background

The Soviet occupation of Afghanistan was a resumption of the Great Game, which had been suspended during the era of British control of Afghan foreign policy. The Third Anglo-Afghan War was ultimately a strategic victory for King Amanulla, as he regained control of Afghan foreign policy in 1919. By 1978, the Soviets had increased their influence in the country, which was racked by increasing political turmoil. Seeing the communist Afghan revolution disintegrating and impelled by fears of US influence, the Soviets decided to intervene directly and establish a puppet government. The Soviets already had a considerable presence in the country, in the form of advisors and military forces. On Christmas Eve 1979, the Soviet forces began flying into Kabul and Bagram. Almost simultaneously, Soviet Ground Forces

rolled in from Turkmenistan and Uzbekistan. By 26 December, there were 50,000 troops in country. On 27 December, the takeover began. President Amin was killed, and the Soviets installed Babrak Karmal as the new president. Within a week there were 80,000 personnel in the country. Yet, the intent was merely to stiffen the Afghan regime, not get embroiled in fighting. But the countryside declared *jihad*.¹

The Air Strategy

The air strategy derived from the military strategy in support of the political goal. The political goal was “the reestablishment of a stable, orthodox socialist state.”² The Afghan military was fractured and weakened by desertions. The Soviet forces ended up fighting the *mujahideen* for control of the country. It became a fight of logistics in the inhospitable terrain. As per Lester Grau:

The strategic struggle for Afghanistan was to fight to strangle the other side’s logistics. The Mujahideen targeted the ...critical roads over which the Soviet supplies traveled. The Soviets attacked the Mujahideen logistics in two phases. From 1980 to 1985, the Soviets sought to eliminate Mujahideen support in the rural countryside. They destroyed crops and irrigation systems, bombed granaries and rural villages, mined pastures and fields, machine-gunned herds of livestock, and launched sweeps through rural areas to conscript young men and destroy infrastructure. This turned Afghanistan into a nation of refugees...The Mujahideen responded by establishing logistics bases inside Afghanistan. After 1985, the Soviets concentrated their fight against these bases.”³

Westermann calls the first campaign aimed at destruction of the insurgent’s supply infrastructure as a “scorched earth” campaign.⁴ A secondary benefit of scorched earth for the Soviets was the immense refugee pressure on Pakistan, the supplier of men and material for the *mujahideen*.

The military operations evolved as existing doctrinal percepts proved ineffective in the mountains. The Soviets actually controlled only 25% of the land, essentially the territory around

¹ Stephen Tanner, *AFGHANISTAN A Military History from Alexander the Great to the Fall of the Taliban*, (Cambridge, MA: De Capo Press, 2002), pp. 235-237.

² Scott R. McMichael, *Stumbling Bear: Soviet Military Performance in Afghanistan*, (London: Brassey's (UK) Ltd, 1991), p. 9.

³ The Russian General Staff, *The Soviet Afghan War: How a Superpower Fought and Lost*, translated and edited by Lester W. Grau and Michael A. Gress, (Lawrence: University Press of Kansas, 2002), pp. xxiv-xxv.

⁴ Westermann, “Limits of Soviet Airpower,” p. 3.

the U-shaped road network linking the country.⁵ From fixed bases they initially sent out punitive expeditions, usually comprised of mechanized and heavy armored forces, in keeping with the Soviet doctrine of 1979. Despite being supported by airpower, “the mujahideen success against personnel carriers and tanks highlighted the vulnerability of Mechanized forces in mountains.”⁶ In response, by 1984 the Soviets started to modify their air and ground strategy. This shift entailed “moving in the direction of greater reliance upon mobility, long range ordnance from air power, vertical rather than tank-led encirclement, use of specially assigned forces.”⁷ This shift of strategy also resulted in decentralization of the military effort, a change more for the army than for the air arm. For the Air Force, it was mostly the helicopter assets that were decentralized and dispersed and, in remote locations, put under operational command of ground commanders.⁸

Airpower kept playing an increasing role in pursuance of this strategy. Learning fast, the Soviets reacted to guerrilla warfare with a major shift in force structure after the first year itself. While ground troop strength remained at 85,000 men, the number of fighters and helicopters soared, for they reasoned, “The traditional ally of Afghan fighters - their mountains - could easily be surmounted by air power.”⁹ One estimate puts the approximate strength of helicopters at 550 and fixed wing at 275, and this excludes the majority of transport aircraft and all heavy bombers, which were operating from Soviet bases.¹⁰ The increase was mostly in helicopters, since fixed-wing aircraft required larger basing and longer runways, a luxury not available in mountains.¹¹ Stephen Blank argues, “Between 1980 and 1986 Soviet strategy in Afghanistan gradually came to rely almost exclusively on airpower, staking everything on airpower’s capabilities to deliver ordnance, interdict supplies and reserves, isolate the battlefield from the rear, destroy the agricultural basis... and rapidly move troops from point to point.”¹² Not only was airpower increasingly used in the Soviet doctrinal concept of a supporting arm or “force

⁵ Refer to Appendix Map.

⁶ Westerman, *Limits of Soviet Airpower*, p. 7.

⁷ Stephen Blank as quoted in Westermann, “Limits of Soviet Airpower,” p. 8.

⁸ McMichael, *Stumbling Bear*, p. 13. Independent helicopter units were placed under the command of regional army commanders. Fixed wing assets remained under higher level centralized command.

⁹ Tanner, *Afghanistan*, pp. 248-249.

¹⁰ McMichael, *Stumbling Bear*, pp. 80-81.

¹¹ McMichael, *Stumbling Bear*, p. 13.

¹² Stephen Blank quoted in Westermann, *Limits of Soviet Airpower*, p. 10.

adjunct,” it ultimately became a “force substitute” for land forces in the “scorched earth” strategy.¹³

Two major changes occurred after 1986. First, the arrival of the Stinger forced a reduction of helicopter operations as well as a radical change of tactics for all aviation.¹⁴ Second, this period also coincided with a change of military strategy. The Soviet forces gradually reduced offensive operations, transferring the responsibility for most military action to Afghan forces. An Afghan national strategy of reconciliation was started from 1987, at which point the Soviets almost stopped conducting offensive operations. This phase also marked the preparation for withdrawal from Afghanistan.¹⁵ As a result, aviation activity and force levels also declined.

The learning curve of the Soviet military, especially its use of the air arm, is best demonstrated by studying their offensives in the Panjshir Valley north of Kabul. This valley was the stronghold of Ahmad Shah Massoud, the “Lion of Panjshir.” The Soviets launched more than 10 offensives expeditions into this valley.¹⁶ A study of the first and seventh offensives provides a good glimpse at the contrast in operational doctrine.

The First Battle for Panjshir

The Panjshir Valley’s geographical location made it important. Located 45 miles northeast of Kabul, it sits astride one of the two highways connecting Kabul to the North. It was within striking range of the other highway, through the Salang pass, the main supply route for the Soviets. The 90-mile long valley is shaped like a dagger pointing northeast, with a wide southern base and a narrowing tip, only suitable for a large attack from the south. Between Kabul and the valley lay Bagram, a major airbase.¹⁷ It was the importance of the supply route which gave Massoud leverage to obtain an occasional ceasefire from the Soviets, operational breaks which allowed him to recuperate from the mauling the Soviet bear often inflicted.

The initial Soviet offensives followed classic doctrine. Classic offensives began with preparatory bombardment, largely by air, as well as artillery, which could go on for a week. This was followed by the movement of heavily mechanized columns along major roads into the

¹³ Westermann, “Limits of Soviet Airpower,” p. 2.

¹⁴ Westermann, “Limits of Soviet Airpower,” p. 12-13.

¹⁵ Soviet General Staff, *The Soviet Afghan War*, p. 13.

¹⁶ McMichael, *Stumbling Bear*, p. 16.

¹⁷ Tanner, *Afghanistan*, p. 257 .

valleys, with fire support. Troops preferred fighting from inside their vehicles and were reluctant to dismount or leave the valley floors to enter narrow side valleys or canyons.¹⁸ As to their effects, McMichael likens these operations to “a lumbering bear stubbornly making its way through a network of canyons, beset by more nimble jackals and dogs nipping it at every opportunity.”¹⁹

The first offensive in May 1982 exemplifies this analogy of a stumbling bear. The operation was conducted in response to a raid against Bagram air base, with an objective of destroying Massoud’s 3000-strong force. A weeklong bombing operation targeting suspected enemy positions preceded the land forces. The offensive proper started on 17 May as Mi-6 helicopters deposited elite airborne troops at select spots, with six Mi-24 gunships providing air cover by flying a “circle of death.”²⁰ Meanwhile, the main Motor Rifle Division (MRD) entered the valley from the south with Democratic Republic of Afghanistan (DRA) forces in the lead. Masoud’s forces closed the valley behind the DRA by using dynamite, and split the Afghan forces from the Russians. Many of the DRA surrendered or defected. The mechanized forces, some of which were disabled by mines or ambushed from adjoining valleys, were unable to raise gun elevations to target the heights and requested CAS. Using FACs, groups of six Mi-24s provided fire support. This battle also saw the first employment of the SU-25 Frogfoot, which “amazed the mujahideen by its ability to dive steeply in and out of valley crevices.”²¹ Ultimately, the offensive succeeded in controlling the valley floor after two weeks, but only after a Soviet Regiment entered from the North in a surprise move to link up with the South. The valley floor was taken at a heavy cost of 300 to 400 dead, with Massoud and his forces still at large. The Soviets left after a few weeks, returning in August. They again lost 300 dead, but this time demolished villages, fields, and irrigation systems in pursuit of a scorched earth strategy.²²

The Seventh Battle for Panjshir

¹⁸ McMichael, *Stumbling Bear*, p. 15.

¹⁹ McMichael, *Stumbling Bear*, p. 11.

²⁰ Westermann, “Limits of Soviet Airpower,” p. 6.

²¹ Tanner, *Afghanistan*, p. 252

²² This description is taken from Tanner, *Afghanistan*, pp. 251-252; and Westermann, “Limits of Soviet Airpower,” p. 6.

1984 to 1986 marks the high point of the Soviet military in terms of honing operational skills in joint mountain warfare, especially tactical use of air support to enhance mobility and surprise. This Soviet success was the prime catalyst in the US decision to supply the *mujahideen* with Stingers and Orlikon 20 mm guns, to make up for the moderate performance of SA 7 Blowpipes, Dashka 12.7 mm and Zigriat 14.5 mm heavy machine guns.²³ The Panjshir offensive of 1984, Panjshir 7, demonstrates their increased effectiveness.

In the yearlong ceasefire preceding the 1984 operation, Massoud had built up his strength to 5000 men, as well as stocking himself with captured arms, including tanks and heavy guns. Massoud expected the attack, since he had rejected an extension of the ceasefire and Soviet buildups prior to major offensives were easily detected by *mujahideen*. The Soviets positioned three squadrons of Tu-16 bombers across the border. Motorized forces assembled at the mouth of the valley, while airborne troops and helicopters moved to Bagram. Massoud preempted the Soviet attack by striking at various points from April 16 to 21, including targeting fuel convoys and bridges, as well as attacking Bagram air base.

The Soviet operation began on 21 April with a high-altitude no-warning carpet bombing of the valley floor by Tu-16s. Using minesweepers to thwart the mines placed by Massoud, the Soviet ground forces reached halfway up the valley within a week. As per pattern, the Soviet land forces stuck together, refusing to pursue the *mujahideen*, who had moved to the heights in adjoining valleys. In previous operations too, the main force stayed on the valley floor while *mujahideen* on the heights were targeted by small numbers of airborne troops and commandos.

Here the Soviets departed from their normal tactics. In the first week of May, a massive heliborne operation was launched from Bagram, depositing thousands of elite troops in blocking positions on all adjoining valleys, as well as at the head of the Panjshir valley. Simultaneously, the main juggernaut split into uncharacteristic sub-units that entered the side valleys to pound their hammers against the airborne anvils. The surprised *mujahideen* went into total retreat in the highest reaches of the mountains, where the Soviet troops could not follow. Massoud again escaped, but the valley was taken at minimal cost.²⁴ Superior mobility with firepower prevailed.

While Panjshir 7 demonstrates the learning curve of the Soviet forces in large operations, these large offensives became an exception. As Tanner explains, “Except for major offensives,

²³ Westermann p. 9; McMichael, *Stumbling Bear*, p. 90.

²⁴ This description of Panjshir 7 is taken from Tanner, *Afghanistan*, pp. 259-261.

the Soviets had abandoned the lumbering armored columns with which they had begun the war for fast mobile forces. Their counter-insurgency tactics improved steadily as they learned to combine bombing with ground attack and helicopter commandos dropped in the enemy's rear to block mujahideen escape routes."²⁵

Effectiveness of Air Operations

Every possible role of air operations came into play. Given the difficulties of maintaining lines of communication through the inhospitable terrain, transport aircraft flew in supplies from the Soviet Union, as well as missions to supply isolated posts and surrounded garrisons.²⁶ They were also used as for reconnaissance, patrolling convoy routes, airborne command posts, and in night flare drops. Heavy bombers were used from the Soviet Union for applying the "scorched earth" policy, reprisal bombings against villages near the vicinity of *mujahideen* attacks, as well as bombing to precede and support major offensives.²⁷ As one author says, "Strategically, air power played a critical role in depopulating the countryside and denying it through the scattering of mines."²⁸ However, tactically, fixed-wing attack aircraft performed below expectation in "set-piece engagements."²⁹

Ground-attack aircraft were extensively used. However, Mig-21s and SU-17s were unsuited for mountain operations due to flight performance and accuracy issues. The Mig-23/27/24 performed better. But the best was the SU-25, with a design suited for CAS, including armor protection, 8-10 external pylons with a range of armament to match, excellent maneuverability, and accuracy.³⁰ FACs, who would travel with ground convoys or operate from helicopters, became a prized commodity and "the performance of ground FACs and their integration into the maneuver system seem to have been one of the major successes of the war."³¹

Helicopters were the most widely employed air asset, at least till 1986. They were used for six roles: logistical support, reconnaissance, convoy security, evacuation, tactical lift, and fire

²⁵ Tanner, *Afghanistan*, p. 262.

²⁶ Victor Flinham, *Air Wars and Aircraft: A Detailed Record of Air Combat, 1945 to the Present* (New York: facts on File, 1990), p.208. For example by January 1983 the garrison at Khost was supplied completely by air.

²⁷ McMichael, *Stumbling Bear*, pp. 82-84.

²⁸ C.J. Dick, *Mujahideen Tactics in the Soviet-Afghan War*, (Conflict Studies Research Center, 2002), p.11 at http://edocs.nps.edu/AR/org/CSRC/csrc_jan_02.pdf accessed 12 May 12.

²⁹ Dick, *Mujahideen Tactics*, p.11.

³⁰ McMichael, *Stumbling Bear*, pp. 82-84.

³¹ McMichael, *Stumbling Bear*, p. 88.

support. They provided the troops with a mobility unmatched by the *mujahideen*, and their decentralized operations matched perfectly with army requirements. They developed various tactics, the most famous being *desant* (air assault) tactics of vertical envelopment. Pairs were especially useful for investigating civil caravans or search-and-destroy missions.³²

Helicopters were also the most affected by mountain terrain and weather. As the Soviet General Staff recalls, “Flying helicopters in Afghanistan was very difficult.”³³ They were affected by high heliports, high temperatures, dusty strong winds, loss of power, lift capacity and ceiling and vertical air currents over mountain passes and canyons. *Desants* faced unique problems. Landing Zones (LZs) were small, with helicopters at times touching on only one or two wheels, facing risk of a tail rotor brush against steep mountains. Repeat approach to landings was often impossible. For LZs above 2500 metres, loads were lightened, resulting in several flights.³⁴

Training

Training of pilots remained a weak area. Few pilots received specialty training in mountain operations before arrival.³⁵ As the General Staff says “Usually the training was conducted in subunits and units.”³⁶ The general training program suffered from being oversimplified, lacking realism, and stifling the qualities needed for decentralized operations – initiative, boldness, and independence of mind. One Soviet survey during 1987-1989 reported 87% fighter pilots, 98% fighter-bomber pilots and 50% bomber pilots being dissatisfied with tactical training.³⁷

Technology

The introduction of the Stinger adversely affected airpower’s effectiveness. While there are conflicting claims on the actual number of aircraft shot by Stingers and the notion that “Stingers won the war” for the *mujahideen* has also been disputed, the most important effect of the Stinger was to force a change of tactics, forcing fighters higher, and restricting areas of

³² McMichael, *Stumbling Bear*, pp. 86-87.

³³ Russian General Staff, *The Soviet Afghan War*, p. 210.

³⁴ Russian General Staff, *The Soviet Afghan War*, p. 216-217.

³⁵ McMichael, *Stumbling Bear*, p. 93.

³⁶ Russian General Staff, *The Soviet Afghan War*, p. 213.

³⁷ McMichael, *Stumbling Bear*, pp. 93,96.

operations for helicopters.³⁸ The weapons of the era could not be delivered at standoff ranges above the Stinger envelope or outside the missile's horizontal range. This forced aircraft to make a choice between the increased vulnerability of coming low and the ineffectiveness of staying high and firing at extreme ranges. It appears a lot of pilots chose the latter, sacrificing the already low accuracy.³⁹ The Stinger also revealed the vulnerability of base defense in mountains, as exemplified by an incident on 25 September 1986, when three helicopters of an eight aircraft formation coming for landing into Jalalabad were shot down by Stingers, the first recorded use of this missile in Afghanistan.⁴⁰ Stingers also led to countermeasures like flares being introduced.

Most fixed-wing aircraft were unsuited for operations, not only because of flying characteristics, but also due to survivability, target acquisition and accurate weapon delivery technology. Technology of the era could not negate the four areas of concern "all connected with complications introduced by the terrain: navigation to the target area, selection of best approach for the attack, accurate location of the target, and selection of the most suitable munitions."⁴¹ For example, even for the relatively more effective SU 24 Fencer, "an aircraft designed for combat over the Inner German Border ... the aircraft's Shryck MR-1 radar had trouble picking out targets from the rocks and boulders littering the Afghan terrain. Nap-of-earth flying was also nigh-on impossible because of the aircraft's maneuverability."⁴²

Conclusion

The Soviet occupation used heavy lift transports to spearhead the initial foothold in an efficient and effective manner. The Soviets expected a short stay but became embroiled in a 10-year occupation. They rapidly shifted their strategy to one dependent on airpower. Airpower was used both independently for the scorched earth policy as well as in support of ground troops. Their operations were marked by the occupation of major cities, with forays into the countryside for specific missions. The Soviets were not tactically beaten; just strategically worn down. They just grew tired and left.

³⁸ Ed comments, Russian General Staff, *The Soviet Afghan War*, p. 222. Conflicting evidence indicates some also chose to go low level and fast; Westermann, "Limits of Soviet Airpower," p. 12.

³⁹ Westerman, "Limits of Soviet Airpower," p. 13.

⁴⁰ Tanner, *Afghanistan*, p.266.

⁴¹ McMichael, *Stumbling Bear*, p. 84.

⁴² Thomas Withington, "Night of the Flying Hooligans: Soviet Army Aviation and Air Force Operations during the War in Afghanistan 1979-1989," p. 135 in Joel Hayward, *Air Power, Insurgency and the "War on Terror"* at www.airpowerstudies.co.uk/ accessed 12 May 2012.

Airpower usage evolved with time, especially in support of ground operations. The ground operations themselves were the “periodic conventional offensive” against the *mujahedin*.⁴³ The best performers in this role were the helicopters and SU-25 Frogfoot aircraft. However, this airborne-assault and CAS-heavy emphasis, combined with terrain limitations and the weapon technology of the day, led to heavy losses. One estimate puts the total number of aircraft lost in the occupation at 1300, the initial years’ losses being mainly due to operational attrition while later years’ to rebel fire.⁴⁴ Airpower provided good maneuver capability for ground forces, but firepower was not very accurate. Larger numbers made up for accuracy.



⁴³ McMichael, *Stumbling Bear*, p. 126.

⁴⁴ McMichael, *Stumbling Bear*, p. 92.

CHAPTER 5

THE US IN AFGHANISTAN

Introduction

Afghanistan was invaded again after slightly more than a decade. The invader was the United States of America. The force later transformed into a multinational coalition, although predominantly led by America both in spirit and material. The pattern of both the British and Soviet experiences was repeated. The initial invasion was relatively easy followed by a painful occupancy. This chapter concentrates on the initial year to show the evolution of airpower strategy. The initial strategy was very air dominated due to the need for a rapid response by the US after 9/11. However, airpower soon ran out of targets suited to its application. At this stage, a new combined arms strategy emerged; the use of Special Operations Forces (SOFs) to direct airborne firepower, while indigenous troops provided the boots. This phase is covered in the first part of this chapter. In the latter part, Operation Anaconda both exemplifies the evolved method, as well as shows how not integrating airpower correctly results in suboptimal results in mountains.

Background

The withdrawal of the Soviet Union led to gradually increasing turmoil in Afghanistan. The Communist regime of president Najibullah was besieged by the forces of Dostum, Massoud and Hekmatyar, and the country was plunged into civil war. Kabul itself became a battleground. In 1994, a new power, the Taliban, started to grow in strength, led by Mullah Omar and supported by Pakistan. It swept across the country, capturing Kabul in September 1996 and executing Najibullah. By 1999, it ruled 90 percent of the country, with Massoud's Northern Alliance pushed into his native Panjshir Valley, although still unconquered. On 10 September 2001, Massoud was assassinated by members of the Taliban's resident friend Al Qaeda. On 11

September, Al Qaeda terrorists hijacked four civil airliners and crashed them into multiple targets in the continental United States.¹

The Air Strategy

While the US government had not specifically prepared for this contingency, a coherent strategy rapidly evolved.² The military strategy was a subpart of four main political components. First, force application was planned against the perpetrators, whom the US intelligence agencies had identified as Osama Bin Laden and Al Qaeda. Second, force application was necessary against any states that provided them sanctuary, in this case the Taliban government of Afghanistan. Third, building a worldwide counterterrorism coalition was essential. Fourth, enhanced homeland security measures would be developed to prevent or ameliorate any future domestic attacks.³ In sum, it was eventually called the Global War On Terror (GWOT).

The military strategy had three goals and was shaped by two concerns. The goals were “bring down the Taliban Regime, destroy Al Qaeda’s base of operations, and hunt down bin Laden and his principal deputies while concurrently eliminating as many other al Qaeda terrorists as possible.”⁴ The US government’s first concern was to avoid collateral damage so as to not give the impression the US was fighting against the Islamic world. This concern even led to renaming the campaign Operation Enduring Freedom, because the original name, Infinite Justice, was objected to by Islamic scholars on religious grounds.⁵ The second concern was “reluctance of the United states to risk military casualties ... tied to political or media obsessions.”⁶

The two concerns, coupled with the pressure of a swift response across the world, led to adoption of an “air heavy” military strategy. United States Central Command (USCENTCOM) initially predicted a timeframe of months to deploy for a conventional ground-based campaign,

¹ Tanner, *Afghanistan*, pp. 243-287.

² Benjamin S. Lambeth, *Air Power Against Terror: America’s Conduct of Operation Enduring Freedom*, (Santa Monica, CA: RAND Corporation, 2005), p.59.

³ Lambeth, *Air Power Against Terror*, pp.40-41.

⁴ Lambeth, *Air Power Against Terror*, p. 59.

⁵ Lambeth, *Air Power Against Terror*, pp.52-53, 60.

⁶ Tanner, *Afghanistan*, p. 324.

largely due to considerations of geography and a lack of bases.⁷ Airpower offered hope in overcoming these logistical limitations in order to provide the quick response demanded by the public. The “Afghan Model,” consisting of using local proxy forces assisted by airpower, with SOF as the coordinators, emerged as the interim solution to prepare the battlefield for the main land invasion to follow.⁸ Its surprising success made the planned follow on conventional land invasion unnecessary.

Enduring Freedom

Airpower kicked off Operation Enduring Freedom. The first strikes commenced on 7 October 2001, with aircraft launching from Diego Garcia, two aircraft carriers in the Arabian Sea, and Whiteman AFB, Missouri. The 31 target sets included air defense radars, ground forces, command centers, training camps, airfields and aircraft, and SCUD missile launchers. The initial attacks were aimed at neutralizing Taliban air defenses to facilitate uncontested air operations, as well as to drive Bin Laden out of hiding. The coalition air forces secured airspace above 20000 ft for unrestricted operations almost immediately. Mountain cave complexes were targeted for the first time on day five. AC-130 gunships were introduced after two weeks because of their ability to identify ground targets as compared with fast-moving fighters. However ground controllers could not be deployed due to continuing adverse weather.⁹

Coalition air forces soon ran out of targets. Fixed targets had been bombed, sometimes repeatedly, due to bureaucratic battle damage assessment (BDA) criteria.¹⁰ Lack of infrastructure and leadership targets led to the strategic air campaign being labeled “largely ineffective.”¹¹ Thus at day 11, the DOD formally announced a change in target sets from fixed to targets of opportunity in engagement zones.¹² Till now, airpower had deliberately avoided the engagement zones where the Northern Alliance was fighting the Taliban.¹³ However, even here remote airpower’s performance did not match up to expectations, and after a week “Northern Alliance

⁷ Lt Col Craig D. Wills, *Airpower, Afghanistan, and the Future of Warfare*, The Cadre Papers: no. 1537-3371; 25 (Maxwell AFB, AL: Air University Press, November 2006), p. 36. He quotes from Bob Woodward, “Bush at War,” (New York: Simon and Schuster, 2002), p. 43.

⁸ Wills, *Airpower, Afghanistan, and the Future of Warfare*, p. 36.

⁹ Lambeth, *Air Power Against Terror*, pp. 78-90.

¹⁰ Lambeth, *Air Power Against Terror*, p. 106.

¹¹ Wills, *Airpower, Afghanistan, and the Future of Warfare*, p. 38.

¹² Lambeth, *Air Power Against Terror*, p. 94

¹³ Tanner, *Afghanistan*, p. 297.

soldiers began to criticize the effort.”¹⁴ Contributing to airpower’s adverse reputation in the media were instances of civilian casualties as well as accidents.¹⁵

This ineffectiveness led to the birth of the so-called Afghan Model. It was only now that “stung by reports of ineffectiveness, the US dispatched Special Forces and Air Force personnel to the Northern Alliance lines to spot targets and direct specific strikes.”¹⁶ Robert Kugler describes the quick capitulation of the Taliban regime thereafter.

On the ground, Northern Alliance forces were lightly armed and outnumbered by the enemy by a margin of two-to-one. Supported by U.S. precision air strikes, nonetheless, Northern Alliance forces steadily overpowered Taliban and al Qaeda resistance. Key towns in northern Afghanistan—including Taloqan, Konduz, Herat, and Mazar-e Sharif—fell over a three-week period. On November 9, Kandahar, the enemy’s last urban stronghold in southern Afghanistan, fell. On November 13, the enemy abandoned the capital city, Kabul, without a fight. By December 22, U.S. officials were attending a reception in Kabul celebrating the victory and installation of a new pro-American government under Hamid Karzai.¹⁷

Operation Anaconda

Operation Anaconda was the first major joint operation carried out in 2002. As coalition forces won a rapid succession of victories, including engagements at Tora Bora and Zawahar Khili, many Taliban and Al Qaeda fighters escaped to the valley and mountains of Shah-i-Kot, located southeast of Kabul, near the town of Gardez. Planning commenced in January 2002, in response to intelligence reports, and planners expected the operation to be executed at the end of February. The operation was executed by “a Combined Joint Task Force (CJTF), built around 1,411 US Army soldiers and Special Operations Forces (SOF) from the United States and six other nations” to take on “the task of clearing the Shahi Kot valley in eastern Afghanistan of al-Qaeda and Taliban forces who had survived earlier battles.”¹⁸ The primary aim was to

¹⁴ Tanner, *Afghanistan*, p.298.

¹⁵ By one claim 1500 civilians had been killed in 25 days of U.S. bombing. William Branign and Doug Struck, “U.S. Intensifies Bombing,” *Washington Post*, November, 1, 2001 as quoted in Lambeth, *Air Power Against Terror*, p. 99. By end October DOD had confirmed seven incorrectly struck targets. Lambeth, pp. 100-101.

¹⁶ Tanner, *Afghanistan*, p. 298.

¹⁷ Richard Kugler, “Operation Anaconda in Afghanistan,” (Washington: National Defense University, 2007), p. 3 at <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA463075> accessed 12 May 2012.

¹⁸ Headquarters United States Air Force, AF/XOL, *Operation Anaconda: An Air Power Perspective*, (Headquarters United States Air Force, 7 February 2005), p. 3 at <http://www.af.mil/shared/media/document/AFD-060726-037.pdf>, accessed 12 May 12.

capture/kill foreign al-Qaeda leadership and fighters, preventing their escape from the valley.¹⁹ Coalition forces also included approximately 1000 Afghan fighters divided into three teams.²⁰

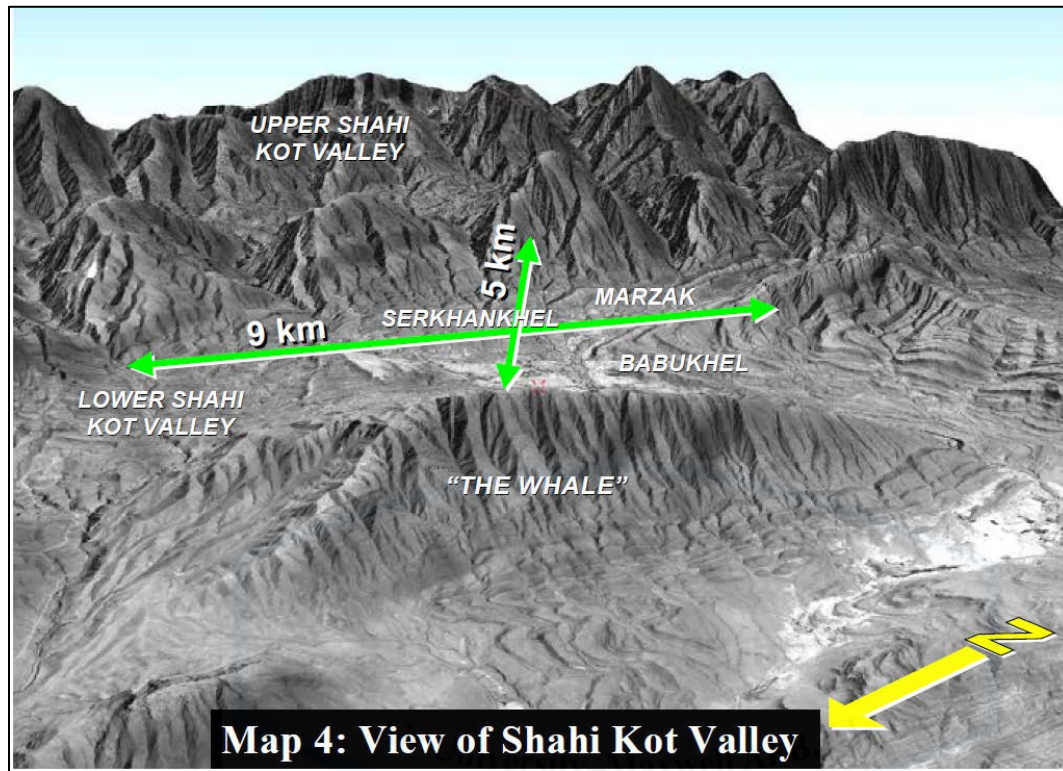


Figure 3: View of Shahi Kot Valley

Source : Major Edgar Fleri, Colonel Ernest Howard, Jeffrey Hukill, Thomas R. Searle, "Operation Anaconda Case Study," (Maxwell AFB Alabama: College of Aerospace Doctrine, Research and Education, 2003)

The ground plan was a classic hammer and anvil operation. The main advance into the valley was to be led by Afghan General Zia Lodin and designed to push and corner the enemy combatants into higher ground, with the other two Afghan teams blocking the northern and southern end of the valley. Simultaneously, US troops were to occupy seven blocking positions through airborne assault. The idea was to bottle up the several hundred al-Qaeda fighters with overlapping rings of troops.²¹

¹⁹ AF/XOL, *Operation Anaconda*, p.5.

²⁰ Lambeth, *Air Power Against Terror*, p. 176.

²¹ Lambeth, *Air Power Against Terror*, pp. 176-177.

The operational plan envisaged two major roles for airpower. First, CH/MH-47 helicopters were to insert troops, with Apache helicopters flying for protection. Second, on-call CAS “catering for two simultaneous CAS events” was planned. More than this requirement was not envisaged, since the area was small, approximately 8 nm by 8 nm.²² Sufficient air effort was available for the task, ranging from AC-130 aircraft to carrier-based forces and land-based fighters. Additionally, while not directly involved with the operations, “the plan was heavily dependent on airlift” to move 700-1000 troops and equipment to Bagram airbase.²³

The plan fell apart from the start. Weather delayed commencement of operations by two days, from 28 Feb to 02 March. The minimal planned preparatory air strikes were soon called off by SOF ground teams, who had not been briefed on these strikes.²⁴ When the main Afghan force, the Hammer, moved in, it was erroneously fired upon by an AC-130 and retreated. The other two Afghan teams were already in place, blocking the southern and eastern valley exits. As the Hammer stalled, the air assault part of the Anvil came under heavy fire while inserting troops and numerous Apaches were damaged. Troops asked for and received CAS from B-52s, F-15s, B-1s, and additional AC-130s after night fall. The AC-130s only operated at night because they were operating within the Stinger vertical bubble. Both the intensity of resistance, as well as the role of airpower, can be gauged from the statistic that out of 177 precision weapons released in the first 24 hours, 162 were “on call” CAS requests.²⁵ Under intense fire, CJTF extracted forces from some of the southern blocking positions.²⁶

The battle continued, with the infamous fight around Takur Gar occurring on 04 March. Objective *Ginger* was one of the Blocking Positions vacated on the first day. This ridge was just below a mountain known as Takur Gar, which had a commanding view of the surroundings. Because of its tactical importance, the mountaintop located at 10200 feet AMSL became a hotly contested battle zone between the CJTF and the enemy. The CJTF attempted to re-insert troops on 4 March. One of the two MH-47s was hit by RPGs while attempting to land. In its attempt to rapidly lift off, a Navy SEAL fell off the rear.²⁷ The effort to rescue this SEAL led to the highest single day of casualties in Afghanistan. Apart from the SEAL, seven more soldiers died, two

²² AF/XOL, *Operation Anaconda*, pp. 6, 34.

²³ AF/XOL, *Operation Anaconda*, p. 57.

²⁴ AF/XOL, *Operation Anaconda*, p. 61.

²⁵ AF/XOL, *Operation Anaconda*, p. 70.

²⁶ The account is taken from AF/XOL, *Operation Anaconda*, pp. 61-66.

²⁷ AF/XOL, *Operation Anaconda*, pp. 73-77.

Chinooks were shot down and multiple Apaches damaged due to enemy fire.²⁸ Once more, “fixed wing air power had to be summoned as an emergency measure of last resort.”²⁹

Coalition forces reacted to the setbacks in the initial phase by rapid adaptation. As per Cordesman, “the next phase of Operation Anaconda was largely air based.”³⁰ The air effort quickly surged in quantity as “General Moseley pulled out all the stops in pushing air power to the fight.”³¹ In fact, the problem now was the unexpected presence of too many aircraft in too small an area, both horizontally as well as vertically. Aircraft were stacked up in sections from ground level to above 60000 feet.³² There were multiple occasions when weapons were dropped through lower occupied levels, as well as instances of ordinance not being dropped, because of traffic, safety, and procedural issues, such as conflicting radio space. In one instance a B-52 landed back after 15 hours on station with all 15 JDAMs and 27 MK-82 bombs on board, after ten aborted attempts to attack targets.³³

The adaptation was not just in quantity but qualitative too. First, command, control, and coordination issues were addressed by moving in experienced senior officers into Bagram. Second, the weapon load on the aircraft was changed to include close air support weapons such as CBU 87s and airburst MK-82s. Third, A-10s, considered better suited to CAS, were moved from Kuwait closer to the area of operations, both for CAS, as well as to act as airborne FACs.³⁴ Fixed wing aircraft flew an average of 65 CAS sorties a day, dropping almost 3,500 bombs, a majority of them precision weapons. Also, the quantity of preplanned CAS gradually exceeded immediate CAS, increasing incrementally.³⁵ The operation gradually wound down after the initial nine days of heavy fighting, ending on March 16. 517 of the enemy were confirmed dead.³⁶

²⁸ Anthony H. Cordesman, *The Lessons of Afghanistan*, (Washington DC:CSIS press, 2002), p.65.

²⁹ Lambeth, *Air Power Against Terror*, p. 190.

³⁰ Cordesman, *Lessons of Afghanistan*, p. 67.

³¹ Lambeth, *Air Power Against Terror*, p. 192.

³² Lambeth, *Air Power Against Terror*, p. 196.

³³ AF/XOL, *Operation Anaconda*, p.76.

³⁴ AF/XOL, *Operation Anaconda*, pp. 78, 79.

³⁵ AF/XOL, *Operation Anaconda*, p. 90.

³⁶ Eric Schmitt and Thom Shanker, “Taliban and al Qaeda Death Toll in Mountain Battle Is a Mystery,” *New York Times*, March 14, 2002, as quoted by Lambeth, *Air Power Against Terror*, p. 199.

Lessons From Anaconda

The most important lesson from Anaconda was correctly utilizing airpower in dedicated operations in mountains. As post-operation analysis brought out, the inadequacy of initial operations resulted from insufficient joint planning by a ground-oriented planning staff. Senior air staff was included in the planning loop just days before the execution.³⁷ Consequentially, the air effort fell short in two ways: wrong intelligence and reduced effort at preplanned CAS/ battlefield interdiction before arrival of the ground troops.

First, the intelligence, which was primarily an ISR output, was insufficient and wrong. The estimated number of enemy fighters in the area fluctuated between less than 200 to an upper estimate of 1000 depending on the source.³⁸ The lesser figure was finally taken as a planning estimate. Lack of using the air component in planning led to insufficient focus of ISR assets in getting a correct estimate. The non-availability of the very competent Global Hawk, due to a fleet grounding during this period, did not help matters.³⁹

This intelligence shortcoming also manifested, in the form of insufficient ISR mapping of the battlefield to extract GIS data of all likely targets like cave hideouts. This shortcoming later contributed to reduced CAS effectiveness, since less accurate co-ordinate extraction equipment with ground troops led to reduced effectiveness of precision weapons as well as increased response times. Second, it also led to the second major planning mistake in using airpower.

On-call CAS became almost the only planned kinetic air support, instead of heavy preplanned target strikes on known or likely enemy hideouts. While “fixed wing air power, largely left out of the initial planning for Anaconda and summoned in full force only at the eleventh hour when events seemed headed for disaster, would be pivotal in producing what ultimately was a successful, if costly, outcome,” it was only a manifestation of its underutilization in the beginning.

There are a number of other lessons from Anaconda, which are pertinent to all mountain operations. First, mountain operations favor de-centralization and smaller force packages. In this case the problem was large forces working with too much decentralization.⁴⁰ Air power faced a

³⁷ Both AF/XOL, *Operation Anaconda*, p. 6; and Lambeth, *Air Power Against Terror*, p. 114, make this point.

³⁸ AF/XOL, *Operation Anaconda*, p. 27-28.

³⁹ AF/XOL, *Operation Anaconda*, pp. 29, 30.

⁴⁰ Lambeth, *Air Power Against Terror*, pp.324-330. He argues that the Afghanistan experience shows both centralized planning and execution. His explanation is about interference from top. My argument is that while air asset allocation was centralized, the actual *targeting* was decentralized because it was the man on the ground that

problem of plenty at Shah-i-Kot. There were too many aircraft in too small an airspace with complicated rules of engagement. For example, within the same area, preplanned targets had to be cleared by CENTCOM, while on-call fires were under the control of multiple FACs, with attendant lack of control of assets. The problem had not been noticed earlier, because till now airpower in Afghanistan had been applied in small packets in a decentralized manner with geographical separation.⁴¹ The confusion was made worse by a single radio frequency.⁴² Airpower assets exceeded their numerical limits of control possible in decentralized execution.

Second, helicopters were simultaneously the most admired air frame by ground forces but also the most vulnerable. Army General Hagenbeck claimed they were the most effective CAS assets he had available.⁴³ The statement reflects two issues. First, it shows the army's intuitive understanding of the maneuver and firepower requirement in mountains, something the helicopters visibly performed under army control.⁴⁴ Second, it reflects their disappointment with the performance of fixed wing airpower. In fact, the army's criticisms of Air Force CAS performance were what triggered a top-level review of Anaconda by Air Force Chief General Jumper.⁴⁵ Yet as Lambeth proves in his defense of Air Force performance, it was fixed wing assets that turned the tide, while it was the rotary-winged assets which took all the hits.⁴⁶ As Cordesman elaborates about the Super Cobra, "they did not operate at optimal levels owing to the extreme elevations at which the battle was occurring. Limited loiter time and the inability of the helicopters to hover in position negatively affected their targeting ability and decreased their accuracy."⁴⁷ Also, "The high altitude of operation, however, forced Apache helicopter pilots to engage in maneuvers that decreased their ability to target ground positions accurately. Unlike aircraft flying at higher altitudes, Apaches were easily targeted and hit by small-arms fire and rocket-propelled grenades."⁴⁸

pointed out the target and so directed the fire. The large percentage of immediate CAS instead of preplanned CAS translates to this form of directing fires.

⁴¹ AF/XOL, *Operation Anaconda*, pp.39-45

⁴² Elaine M. Grossman, "Operation Anaconda: Object Lesson in Poor Planning or Triumph of Improvisation?" InsideDefense.com, August 12, 2004 as cited in Lambeth, *Air Power Against Terror*, p. 222.

⁴³ Lambeth, *Air Power Against Terror*, p. 206.

⁴⁴ It also reflects the army doctrine of firepower as a cover for maneuver, as opposed to airpower's insistence on effects based firepower.

⁴⁵ Lambeth, *Air Power Against Terror*, p. 208.

⁴⁶ Lambeth, *Air Power Against Terror*, pp.163-231.

⁴⁷ Cordesman, *The Lessons of Afghanistan*, p.66-67.

⁴⁸ Cordesman, *The Lessons of Afghanistan*, p.67-68.

Third, mountains degraded the performance of fixed wing aircraft too. Their performance was especially criticized by the army.⁴⁹ However, shortfalls of performance were actually a manifestation of the problem of target acquisition in mountainous terrain, despite state-of-the-art avionics. This can be seen by two examples. First, the army “perspective was that the precision bombing process slowed down close air support and delayed vital suppressive fires” and “Army planners chafed at having to transmit precision coordinates in order to employ JDAMs.”⁵⁰ The efficacy of the JDAM strike depended on the accuracy of the target coordinates and elevation data – extracted mostly by the ground SOF in CAS situations. Thus, it was the requirement of extracting accurate target data that the army really chafed at, not an easy task in mountains, and requiring special equipment.⁵¹ And the reason the air planners preferred this mode of targeting is explained by an incident in Anaconda on day one.

A truck moving up a mountain road being looked at by a Predator for hours could not be targeted by a succession by F-16s and F-18s because “The truck was difficult to find without a FAC in place to pass along the coordinates and help talk the aircraft onto the target.”⁵² To be hit, a target had to be acquired by the fighter, which was difficult. The other way was to make target acquisition by aircrew immaterial. This could be done either by ground laser designation and LGBs, or accurate JDAM targeting, which required accurate coordinate extraction by someone – and more often than not that someone was a SOF asset on the ground. The statistics of weapon usage in Anaconda show more reliance on JDAMs for immediate CAS in the first phase of fighting.⁵³ It was the problem of target acquisition in mountains which forced this mode of targeting, a process which removes the onus of target acquisition from the aircrew.

⁴⁹ Lambeth, *Air Power Against Terror*, p.208.

⁵⁰ AF/XOL, *Operation Anaconda*, p. 68

⁵¹ Not all GFACs had the equipment required to determine precise co-ordinates. AF/XOL, *Operation Anaconda*, p. 77.

⁵² AF/XOL, *Operation Anaconda*, p.69

⁵³ AF/XOL, *Operation Anaconda*, p. 101. Refer graph in Fig 4 showing breakdown of all weapons used from 02 March 12 to 15 March 12. GBU-31s are the JDAMs; GBU-12s are LGBs and presumably “pre” stands for preplanned.

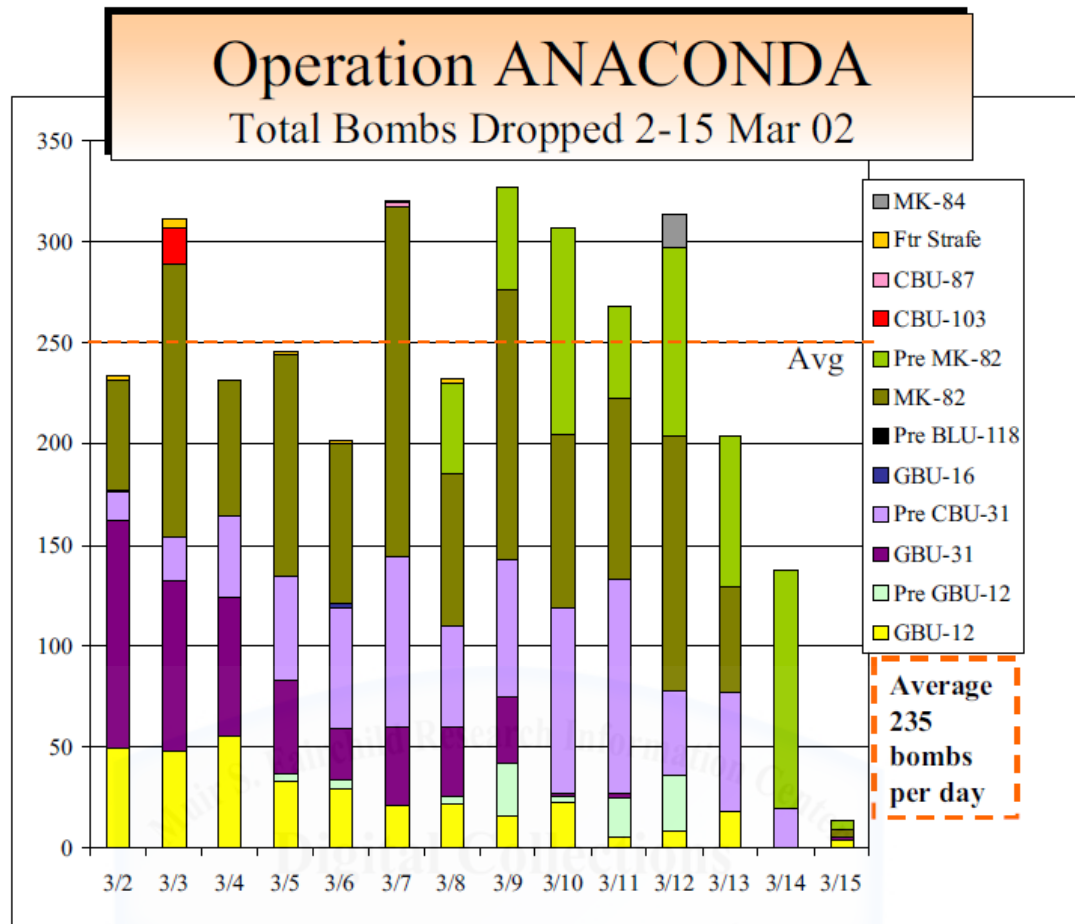


Figure 4 : Operation Anaconda, Bombs dropped 2-15 Mar 02

Source: AF/XOL, *Operation Anaconda*, p. 101.

Another problem for fixed wing aircraft was the weather. The initial operation was delayed by two days due to weather. Subsequently, bad weather and low clouds caused operations to pause on 7 March, and also led to an increase in preplanned JDAM strikes on that day, negating target acquisition requirements.⁵⁴

A largely unsung role of airpower responsible for turning the tide fast is supply. The unexpected setback in the initial days caused the operation to extend well beyond planned duration. This created a demand for supplies and fresh troops. This demand was met by airpower

⁵⁴ AF/XOL, *Operation Anaconda*, p. 93.

as “A continual flow of airlift kept troops and supplies moving back and forth from Kandahar to Bagram.”⁵⁵

Beyond Anaconda

After Anaconda, coalition forces settled into a Counterinsurgency (COIN) mode. The period up to 2006 was a “period of hibernation” for the war in Afghanistan.⁵⁶ Hamid Karzai was elected president and a government was soon in place. Yet the Taliban had not been destroyed as a force and kept creating challenges for coalition forces. The coalition forces had achieved their objective of changing the government, but in Clausewitzian terms, the source of enemy power, the opposing army, was still intact, even if dispersed. The period from 2006 to 2009 saw an upswing in operations, with attendant surges in both ground troops as well as airpower usage. As an indicator, the number of CAS sorties doubled from 6495 in 2004 to 13965 in 2007 and tripled to 19,603 in 2008.⁵⁷

Only once more would the enemy challenge the coalition forces in a fixed battle – Operation Medusa in September 2006. This was a NATO operation carried out to clear an area 30 miles west of Kandahar in the Arghandab valley. Surprisingly, the Taliban decided to dig in and fight instead of melting away as they were wont to do. It was almost a replay of Anaconda in many ways, just the actors had changed. The operation was led and planned by a Canadian ground force, with American air support. However, once again, the initial planned aerial bombardment targeting “between 10 and 29 insurgent command and control nodes” was cancelled and ground forces moved in with insufficient intelligence.⁵⁸ Airpower kicked in later as CAS. The operation “caused expenditure of more ordnance in a few weeks than was expended in Iraq during all of that year.”⁵⁹ As Day says of the Canadian soldiers, “They had trained for

⁵⁵ AF/XOL, *Operation Anaconda*, p. 84

⁵⁶ Rebecca Grant, *Airpower in Afghanistan*, Mitchell Institute Press, February 2009), p. 6 at <http://www.afa.org/mitchell/reports/0209airpowerinafghan.pdf> accessed 12 May 12

⁵⁷ 2004-2008 Combined Force Air Component Commander Airpower Statistics as published in Grant, *Airpower in Afghanistan*, p. 17.

⁵⁸ Adam Day, “Operation Medusa: The Battle for Panjwai,” *Legion Magazine*, September 1, 2007 at <http://www.legionmagazine.com/en/index.php/2007/09/operation-medusa-the-battle-for-panjwai/> accessed 30 April 2012.

⁵⁹ Grant, *Airpower in Afghanistan*, p. 16.

counter-insurgency warfare, but what they found was a lot closer to conventional war.”⁶⁰ He lists the name of 19 dead soldiers, a fairly high number. Medusa claimed approximately the same number of enemy forces as Anaconda at 512 dead.⁶¹ It seems whenever aerial bombing does not precede land operations in large scale battles in mountains, friendly casualties increase.

Effectiveness of Air Operations

Airpower has proved extremely effective in Afghanistan, but not in its conventional roles. The initial operations to gain air superiority proved almost superfluous. However, once air dominance was assured, airpower seemed to be at a loss for a purpose. American airpower theory has traditionally stressed strategic and independent operations.⁶² In Afghanistan it was forced to perform primarily CAS missions, its least preferred role. This was both a requirement generated by the terrain, as well as made difficult to execute because of it. And yet, relative to other roles, it turned out to be the most effective.

The Afghan Model relied heavily on airpower for firepower. Much has been written about the SOF and air synergy. But, as Stephen Biddle emphasizes, it was not a battle of a few aircraft supported SOF against the Taliban. It was instead a conventional land battle amongst indigenous peoples, supported by Western technology. There were 60-80,000 Afghan troops in battle on both sides. The outcome in these conventional battles was “affected profoundly by SOF-directed precision air power.”⁶³

Mountains affected both the indigenous and coalition troops to the same extent. The operation at Tora Bora was conducted with more indigenous Afghan troops, while Anaconda had a greater proportion of American troops. As Wills argues, “the relatively large presence of American troops in Anaconda should have produced much better results than those at Tora Bora . . . but the result was the same. The battle ended when the enemy decided to leave.”⁶⁴ Terrain

⁶⁰ Adam Day, “Operation Medusa: The Battle for Panjwai,” *Legion Magazine*, 26 January 2008, <http://www.legionmagazine.com/en/index.php/2008/01/operation-medus-part-3-the-fall-of-objective-rugby/>, accessed 30 April 12.

⁶¹ David Markland, “Operation Medusa: Fog of War, NATO’s Failure and Afghanistan’s Future,” *Seven Oaks Magazine*, Feb 02, 2007 at <http://www.sevenoaksmag.com/features/afghanistanaftermedusa.html> accessed 21 Feb 12.

⁶² Tami Davis Biddle, *Rhetoric and Reality in Air Warfare: The Evolution of British and American Ideas about Strategic Bombing, 1914-1945*, (Princeton: Princeton University Press, 2002).

⁶³ Stephen Biddle, *Afghanistan and the Future of Warfare: Implications for Army and Defense Policy*, (Carlisle PA: Strategic Studies Institute, US Army War College, November 2002), p. 44.

⁶⁴ Wills, *Airpower, Afghanistan and the Future of Warfare*, p. 48.

affects all foot soldiers the same. Airpower, combined with ground troops, was crucial in forcing the enemy to leave. Alone, either of the two forms of power would have been severely restricted by the terrain.

The popularity of helicopters and disappointment with fixed-wing aircraft among ground troops has a deeper reason, which the mountains bring into sharp relief. There is a fundamental doctrinal difference of approach by the Army and Air Forces to war fighting. Armies doctrinally believe in fire and maneuver as a way of fighting, where the purpose of fire is to provide cover for the maneuver. As the School of Advanced Military Studies (SAMS) acknowledges, “There is a popular axiom in the combat arms community: Fire without movement is wasted ammunition, and movement without fire is suicide. This adage drives home the lessons of fire and maneuver to the small unit leader.”⁶⁵ The army soldier likes the fire he can see; rocket fire from a helicopter or a strafing attack by an A-10, while a single bomb dropped by an unseen high altitude bomber appears to do nothing for maneuver. In all air to ground doctrine, the Air Force believes in *fire* almost as an end in itself. A huge amount of Air Force operational planning revolves around targeting. The targeting is to create effects. And mountains reduce these effects.

Technology

This war saw the highest end technology used to date. Networking of sensors, decision makers, and shooters made possible the ground-air synergy that characterized the Afghan Model. The sophistication of sensors allowed targeting which no longer depended on the human eye, whether on ground or in air, and resulted in freedom of operation by night. For example, during Anaconda the ordnance dropped by night was almost half that by day, being more than day on four occasions.⁶⁶

Technology was also manifest in the innovations adopted by coalition forces. This war saw new weapons being introduced in response to the terrain. As Lambeth supports, “The use of mountain cave hideouts by al Qaeda forces also provided an incentive for the rapid development of new earth-penetrator weapons.”⁶⁷ These included the AGM-86D Air Launched Cruise Missile (ALCM) with a modified warhead, the modified GBU-24 advanced unitary penetrator, as well as

⁶⁵ SAMs Student Text Design Team, *Art of Design Student Text Version 2.0*, p.159

⁶⁶ AF/XOL, *Operation Anaconda*, p. 103. Figure 9.

⁶⁷ Lambeth, *Air Power Against Terror*, p. 288.

BLU-118B hard target thermobaric device.⁶⁸ The altitude of operations also brought home the limitations of other equipment. For example, the LANTIRN targeting pod's effectiveness was reduced because its laser was software inhibited above 25,000 ft.⁶⁹ When AC-130 gunship crews requested for live video streaming from Predator remotely piloted aircraft (RPAs), the capability was developed in six days.⁷⁰ The combination of RPA eyes for heavy gunships proved very effective. The prototype Broadcast Request Imagery Technology Experiment (BRITE) enabled ground operators to request for and obtain high-resolution satellite imagery of a point of interest over the hill, delivered almost in real time.⁷¹

The war also brought home the importance of unmanned aircraft system (UASs), and facilitated development of many of their capabilities. The RQ-1 Predator, introduced for ISR, was initially limited to a ceiling of 25,000 feet, an altitude at which it is vulnerable to SAMs in mountains.⁷² Between October 2001 and February 2002, at least three Predators were lost due to bad weather and icing at high altitude.⁷³ The latest MQ-9s, renamed for air-ground weapon delivery, have been modified to operate at 50,000 feet, and also fitted with wing de-icing systems.⁷⁴ The Global Hawk high- altitude RPA proved of great use, and its non-availability during Anaconda contributed to poor intelligence.

Another capability developed specifically for mountains was precision airdrop. This capability bloomed between 2005 -2006. This period saw a shift from emergency to routine resupply. The drop altitudes had to be shifted up to avoid ground fire. Air Mobility Command responded with the Joint Precision Airdrop System (JPADS). This permits guided cargo to land

⁶⁸ Lambeth, *Air Power Against Terror*, p. 288-289.

⁶⁹ Lambeth, *Air Power Against Terror*, p.289, quoting Vernon Loeb, "Up in Arms," *Washington Post*, January 11 2002. Interestingly the Indian Air Force faced the same problem with its Litening pods during the Kargil conflict, and innovated to circumvent it.

⁷⁰ "Q and A with Air Force Secretary James Roche," *Business Week* online, February 1, 2002, quoted in Lambeth, *Air Power Against Terror*, p. 256.

⁷¹ Tim Friend, "Search for Bin Laden Extends to Earth Orbit," *USA Today*, October 5, 2001, quoted in Lambeth, *Air Power Against Terror*, pp. 276-277.

⁷² Ceiling taken from factsheet at <http://www.af.mil/information/factsheets/factsheet.asp?fsID=122>, accessed 21 Feb 2012

⁷³ Daniel L. Haulman, US Unmanned Aerial Vehicles in Combat, 1991-2003, 9 Jun 2003 , pp. 6,7 at <http://www.afhra.af.mil/shared/media/document/AFD-070912-042.pdf>, accessed 21 Feb 2003

⁷⁴ As given in <http://www.airforce-technology.com/projects/predator-uav/>, accessed 21 Feb 12

in “an area the size of a football field.”⁷⁵ This capability “has saved soldiers’ lives by offsetting ground convoy requirements and reducing rotary wing sorties intended for airdrop operations.”⁷⁶

Training

The quality of peacetime training served the Coalition Airmen well. As the AF/XOL notes in lessons learned from Anaconda, “Coalition Airmen pulled off tremendous feats of rapid adaptation. They strafed, bombed, and loitered where necessary to deliver close air support in an area less than a fourth the size of one *Desert Storm*-era kill box. Superb aircrew training paid off in the ability to adapt to unfamiliar missions and do CAS with platforms never designed for that role.”⁷⁷

Yet, the very requirement to adapt and fight a new way shows that the Airmen went in trained for a different environment. This applies as much to the planners as to the operators. The planners executed the initial air campaign as per the book, but soon ran out of targets to hit. The operators were not new to war fighting, courtesy of the experiences post-1991. But tactical requirements were new. For example, who would have thought “the fighter force’s use of strafing and rocket attacks would be viewed as the techniques of choice to break ground engagements.”⁷⁸ The ability of fixed-wing aircraft to operate above the man-portable (MANPAD) SAM bubble, resulting in no fixed wing aircraft being shot down, was a remarkable achievement. But terrain and weather took its toll on the inexperienced. By the end of 2002, 12 helicopters and three fixed wing aircraft had crashed, apart from the two Chinooks shot down in Anaconda. ⁷⁹ As of 2009, “while 5% of U.S. deaths in Iraq have been caused by helicopter crashes — 216 out of 4,348 — the total is 12% in Afghanistan — 101 of 866.”⁸⁰

Even for the platforms designed for CAS, their effectiveness owes much to training. Two A-10 pilots, on being queried separately on the reason for the A-10’s superior performance, gave

⁷⁵ Grant, *Airpower in Afghanistan*, p. 26.

⁷⁶ 2008 Army Posture Statement Information Papers, “Joint Precision Airdrop Systems.” Quoted in Grant, *Airpower in Afghanistan*, p. 26

⁷⁷ AF/XOL, *Operation Anaconda*, pp. 112-113.

⁷⁸ Grant, *Airpower in Afghanistan*, p.3

⁷⁹ http://military.wikia.com/wiki/List_of_Coalition_aircraft_losses_in_Afghanistan

⁸⁰ Mark Thompson, “Why Flying Choppers in Afghanistan is so deadly,”: *Time U.S.* , Oct 27, 2009 at <http://www.time.com/time/nation/article/0,8599,1932386,00.html>, accessed 21 Feb 2012

sole credit to training. CAS was what they trained for in peacetime. Ground air cooperation was a part of their routine training.⁸¹

Weather

Weather in the mountains has continued to affect operations in this theater to date. In the initial invasion, the “weather complications kept CENTCOM from getting a significant SOF presence on the ground to work with the Northern alliance and enable precision attacks against emerging targets until around the third week of October.”⁸² Anaconda was delayed by two days due to weather, and bad weather put a dampener on operations in the middle of Anaconda. Weather has contributed to both manned and unmanned aircraft crashes. The statistics of munitions dropped from 2004 to 2008 show the effect of weather/season on the tempo of operations. In every year the air operations have peaked in the summer months and hit their troughs in the winters.⁸³ This is a reflection of the lack of mobility in winter, which forces all combatants to go into hibernation. As one author observes, seasons caused “a winter war pause that normally lasted through May.”⁸⁴

⁸¹ Interview 16 March 2012

⁸² Lambeth, *Air Power Against Terror*, p. 358

⁸³ 2004-2008 Combined Force Air Component commander Airpower Statistics as published in Grant, *Airpower in Afghanistan*, p. 23. The summer peak has gone up to 670 in August 2007 and been as low as a single weapon dropped in some winter months of 2004-2005. The same trend is visible in the statistics of each year, while overall weapon drops per year have increased.

⁸⁴ Grant, *Airpower in Afghanistan*, p. 20.

Table 1: Munitions dropped in Afghanistan from 2004 to 2008

Munitions Dropped in Afghanistan by Month and Year <i>(As of December 31, 2008)</i>					
	2004	2005	2006	2007	2008
January	1	1	5	178	190
February	3	1	23	163	259
March	7	1	42	310	265
April	1	23	63	202	166
May	3	7	59	179	327
June	24	10	141	288	646
July	16	16	216	368	515
August	9	20	242	670	385
September	13	9	329	406	230
October	4	19	240	198	182
November	1	23	201	289	120
December	4	46	209	321	84
Total	86	176	1,770	3,572	3,369
<i>Source: 2004-2008 Combined Force Air Component Commander Airpower Statistics</i>					

Source: Rebecca Grant, *Airpower in Afghanistan*

Today's technology can certainly mitigate the effects of weather. OEF saw the highest percent of all-weather weapons used. While this may be a result JDAMs just being cheaper than other precision weapons, or being a weapon of choice due to removing the pilot from the target acquisition loop, the fact remains that the mountains invited their use.

Table 2: Weapons data for recent military operations

<i>Military Operation</i>	<i>Weapons</i>			<i>Percentage</i>	
	<i>Total</i>	<i>Precision^a</i>	<i>All-WX^b</i>	<i>Precision</i>	<i>All-WX^c</i>
Desert Storm	265,000	20,450	333	8	0.1/ 2
Allied Force	23,000	8,050	985	35	4/12
Enduring Freedom ^d	22,000	12,500	7,300	57	33/58
Iraqi Freedom ^e	29,199	19,948	9,645	68	33/48

Source: Kenneth Tatum, "The Impact of All-Weather Precision on Escalation Dominance" (student paper, School of Advanced Air and Space Studies, Maxwell AFB, AL, 2003), 4.

^aPrecision weapons include the LGBs, Mavericks, AGM-130s, Hellfires, and all of the All-WX weapons.

^bAll-WX weapons include the Tomahawk land-attack missile (TLAM), enhanced guided bomb unit (EGBU), JDAM, high-speed antiradiation missile (HARM), joint standoff weapon (JSOW), and wind corrected munitions dispenser (WCMD).

^cAll-WX percentages are of Total/Percentage of Precision.

^dAll data is estimated as of April 2002.

^eData is current through 18 April 2003.

Source: Lt Col Craig D Wills, *Airpower, Afghanistan, and the Future of Warfare, an Alternative View*, The Cadre Papers: no. 1537-3371; 25, (Maxwell AFB, AL: Air University Press, 2006), p. 11.

Conclusion

Operation Enduring freedom was mounted in a hurry. The peculiarities of terrain and geographical separation between the US and Afghanistan led to an initial air heavy campaign. However, airpower alone could achieve limited objectives. Strategy evolved into the Afghan Model of using SOF assisted airpower to provide firepower to indigenous ground allies. This mode of firepower proved pivotal in collapsing the Taliban regime. This phase of the war consisted of a series of battles for the key cities around Afghanistan. The Taliban and al Qaeda were defeated but not annihilated. After the Taliban fell, they found refuge in the mountains. Therefore the subsequent part of the occupation saw the battle move into the mountainous countryside. Anaconda demonstrated the difficulties of this kind of battle. Again the enemy was defeated, but could not be captured or annihilated. Airpower had to adapt operational art and tactics to fighting this type of battle.

CHAPTER 6

ANALYSIS

The primary purpose of any theory is to clarify concepts and ideas that have become, as it were, confused and entangled.

Carl Von Clausewitz

Introduction

This chapter analyses how mountains affect airpower. It uses the evidence from the three experiences from 1916 to the last decade to see what patterns emerge. The initial part of the chapter uses Colin Gray's writings on the advantages and limitations of airpower as a lens of study to see how mountains affect them. The latter part searches the patterns to comment on the dominance or unimportance of various roles of airpower and the implications thereof. These lessons have practical applicability in how militaries need to create a niche doctrine, to develop a tailored training program, and to build an adequate force structure for mountain warfare.

The Advantages of Airpower

Gray lists seven advantages of airpower: ubiquity and therefore a global domain, the overhead flank, unlimited range and reach, speed in mission execution, geographically unrestricted routing, superior observation, flexibility which allows decisive concentration of force.¹

Ubiquity comes to the fore in mountains. The reason is, naval power is ineffective, unless it uses airpower. Land power can reach the enemy in mountains but is unable to reach the highest and remotest areas with ease. That is where the all-pervading presence of air allows airpower to be used. Whenever a weaker force has been attacked by a superior land force, it has retreated into the highest reaches where conventional forces have been loath to follow.² A common pattern of the irregular nature of this warfare is that the regular forces attack uphill and retreat downhill, while the irregular hill forces do exactly the reverse, preferring to "crown the

¹ Colin S. Gray, *Explorations in Strategy*, (Westport: Praeger Publications, 1996), p.72.

²For example, Massood's men retreated up into the higher reaches when confronted by Soviet combined arms offensive during Panjshir 7. See Tanner, *Afghanistan*, p. 261.

heights.”³ Airpower can, however, reach any height, and so is able to crown the highest heights. During the Kargil conflict, the enemy post at Tiger Hill was well dug in on a steep slope. It was only after an effective LGB targeted it, that the post finally fell to Indian Army troops.

The protection provided from the *overhead flank* gains greater importance in mountains. The reason is the lack of mobility and support possible due to the restrictions of geography. Unlike plains, where parallel land columns can diverge and converge at will to provide both flank protection as well as concentration when required, in mountains they are forced to form smaller separate groups or large strung out columns. Air provides flank protection from both above as well as from the flanks. Before airpower appeared, the British columns adapted to restricted mobility by using pickets ahead and behind columns as protection. The establishing and dismantling of pickets itself slowed the columns further and positioned the pickets at vulnerable points. The arrival of airpower allowed pickets to be replaced by airborne patrols which not only became the eyes of the column but also its protection. The Soviets used airpower, especially helicopters, much the same way for their forays into the countryside. They used the helicopters to land troops on key terrain ahead of convoys and later extract them.⁴

Range and reach helped the British, Soviets and Americans in projecting power into mountains. The effect of airpower in reaching into Afghanistan during the Third Afghan War, much before the army could, proved instrumental in convincing the Amir of the range and reach of airpower. The initial Soviet entry was spearheaded by heavy airlift. Enduring Freedom exemplifies the range and reach of airpower, where terrain and distance precluded large force projection by land forces, leading to an air heavy strategy.

Speed of response too is of great importance in mountains. As Gray says, “Speed of response is not always critical, but when it is, the potential strategic effectiveness of air power al but speaks for itself.”⁵ Airpower has provided the strategic tool for speed of response in mountains. The British policy of Air Control depended on speed of response to nip troubles in the bud. Airpower allowed America to project force within 30 days, as opposed to the multiple months envisaged for a land troop deployment. The same holds good at the tactical and operational level. Before the arrival of the airplane, the Pashtuns had the superior speed of land

³ Colonel C E Callwell, *Small Wars: Their Principles and Practice*, 3rd ed. (London: 1896; London: H.M.S.O., 1906; Lincoln, Nebraska: University of Nebraska Press, 1996), p. 292.

⁴ McMichael, *Stumbling Bear*, p. 57.

⁵ Gray, *Explorations in Strategy*, p. 69.

movement, attacking and dispersing against slow British columns. Airpower reversed the speed advantage. After the initial setbacks in Anaconda, it was the speed of response that allowed airpower to step in, both for kinetic support as well as for moving in reinforcements.

The advantage of *geographically unrestricted routing* is diminished in mountains. This happens in two ways. First, aircraft with low operational ceilings, like helicopters and some fixed-wing aircraft, are forced to fly valley contours, much like their land counterparts. This makes their flight paths predictable and increases vulnerability. For example the MH-47 helicopter shot down by RPG fire on 4 March 02 during Anaconda was “following a flight path similar to the first two helicopters a few hours earlier.”⁶ A similar shooting down of the trail helicopter of a flight of four occurred during the Kargil conflict. Second, even the aircraft that can fly well above crests, as well as enemy defenses, are often forced to fly restricted headings to targets in the terminal phase of attack.

Superior observation becomes a critical advantage in mountains. Again, its importance is directly proportional to the difficulty of land forces observing over a hill. Airpower’s military use started because of this advantage, and has proved crucial in mountains. This has remained true for all three forces that have used airpower in the region. However, the early years also brought out the inability of the naked eye in spotting small and well-hidden targets. Despite tremendous advances in ISR technology, this problem has not been totally alleviated against small well-hidden targets. Enduring Freedom saw the use of measurement and intelligence signature (MASINT) through foliage penetrating radars, hyper spectral imagery, infrared sensors, magnetic field trackers and gravity measuring instruments to increase the depth of vision.⁷ The biggest difficulty against which these sensors have been employed is to see beneath the ground, the ultimate sanctuary in mountains.

Flexibility in concentration is reduced in mountains. Gray explains that the earlier advantages of “speed, range and reach, and agility of airplanes allow them to concentrate with a flexibility unmatched by vehicles specialized for operation in the land and sea environments and to achieve a potentially decisive concentration of force at the critical point.”⁸ It is not only land forces that are forced to split up in mountains. Geography has traditionally limited the number of

⁶ AF/XOL, *Operation Anaconda*, p. 74.

⁷ Revkin, “New Sensors Report, ‘I Know They’re in There I Can See Them Breathing,’” in Lambeth, *Air Power Against Terror*, p. 290.

⁸ Gray, *Explorations in Strategy*, p.71.

aircraft operating over a small area. The British sent flights of two to three aircraft each. While this may have been also due to the total small numbers available, small unit and formation size has been the norm in mountains. The Soviets used their Mi-24 helicopters in maximum flights of six when flying protective *circles of death*. More often they were used in pairs. One of the problems of Anaconda was concentrating too many aircraft in too small an airspace. In all these cases, the enemy was small in numbers and dispersed. However, even if airpower were to be used against a conventional opponent, because mountains split land forces into small segments, there should not be a need to concentrate excessive numbers. Thus, mountains both need and permit only small numbers of aerial assets in a particular area.

The Limitations of Airpower

Gray lists the following limitations of airpower: gravity, sophistication/expense/low numbers, weather, brevity of presence.

The problem of *gravity* is exacerbated by mountains. The useful payload that can be lifted is reduced by the higher altitude of operations. While in absolute terms, payload capacity has been increasing over the past century, it is still more economically inefficient than if the same payload can be transported by road. But in circumstances when it cannot, or time is of the essence, even the limited payload is invaluable. Where it especially matters is if the altitude of the take off base is high. This is true both for supply load as well as ordnance. The destination altitude and topography matter if the load is to be landed, especially by helicopter. In other cases, e.g. the load can be airdropped, the British and even Soviets suffered from an inaccuracy of drops and small landing zones. The US experience has been better, because technology such as JPADS has increased the accuracy of drops.

However, for sustained occupation, road/rail networks are essential. This was the reason why the British built up the road network in the NWFP, which was opposed by the tribes for the very same reason.⁹ The same lesson has been learnt in Afghanistan by the ISAF, as asserted by multiple experts. Counterinsurgency expert Kilcullen shows, “As noted by Malkasian, Eikenberry, Legree, and Cavoli, road construction in this area and elsewhere served the key

⁹ Roe, *Waging War in Waziristan*, pp. 227-230.

function of connecting the government to the people.”¹⁰ The insurgents realize this and so oppose the roads as vehemently today as they did a century back.¹¹

Gray argues that airpower is *sophisticated* and very *expensive*, and so tends to lead to *low numbers* of assets. In deciding the balance between large numbers of low cost/quality aircraft against small numbers of high cost/quality aircraft, he uses Hallion’s argument that “[s]ophistication should not be sacrificed to numbers.”¹² This argument holds even more in mountain warfare. The increased lethality of airpower in mountains owes a lot to technology – from sensor to shooter. Coupled with the earlier conclusion that large numbers are not required, the requirement of effective firepower does need the right technology — therefore low numbers/high technology is ideal. But it should be technology suited for mountains. The Bristol, Su-25 and A-10 performed well at CAS. Aircraft like the Handely Page, Tu-16 and B-52 also performed well in mountains, but in other roles. The B-52, in particular, even performed as well at CAS because of onboard technology, albeit with different techniques. The former three specialized in close CAS, also employing strafing, amongst other methods of attack. This made their contribution both effective and visible to ground troops.¹³ The latter three specialized in standoff bombing, and were unable to strafe. Given the technological bombing accuracy of a B-52, what reduces its performance is the inability to see the target from standoff range unless cued by someone. Thus, the pure CAS aircraft are better at stand-alone, close-range operations, while most modern aircraft can perform well when operating in synergy with ground troops. However, aircraft carrying out classical low-altitude CAS are also more vulnerable and require a *permissive* environment. They are cheaper if control of the air is not contested, but if it has to be, multirole aircraft with adequate technology will be a satisfactory solution.

Weather, and its related cousin, seasons, has continuously played a role, though offset somewhat by technology in recent years. As mentioned earlier, at strategic levels, seasonal weather decides when ground operations are feasible, which also applies to the supporting air

¹⁰ David Kilcullen, *The Accidental Guerrilla, Fighting Small wars in the midst of a Big One*, (New York: Oxford University Press, 2009), p. 105

¹¹ Kilcullen, *The Accidental Guerrilla*, pp. 236-237. He recounts an incident in FATA region of Pakistan, where the road building party was scared off by Al Qaeda and tribal forces in 2006.

¹² Richard P. Hallion, *Rise of the Fighter Aircraft, 1914-1918*, (Baltimore,MD: Nautical and Aviation Publishing Company of America, 1984), p. 151; cited in Gray, *Explorations in Strategy*, pp.81-82.

¹³ Sean Naylor, *Not a Good Day to Die*, (New York: Berkley Caliber Books, 2005), p.352. An aircraft like the A-10, which is designed for CAS, can strafe a lot longer than say an aircraft designed for air to air role or bombing. During Anaconda, a pair of F-15 Es that came to fill the gap left by a departing AC-130, soon ran out of cannon ammo and were not allowed by ground troops to drop JDAMs.

operations. Both air and ground operations have traditionally been more extensive in summers than winters. This is also true of the Kargil conflict, where in winter infiltrators occupied the high peaks that had been vacated by the Indian Army. The actual conflict occurred in summer. Operation Enduring Freedom started in winter, due to the need for a swift post-September response. But the fact that most of the subsequent battles were for the main cities may have had to do with the seasons, since dispersal of Taliban to the countryside may not have been feasible. The fighting migrated to the countryside and mountains only later. Anaconda, a battle in the mountains, took place in March.

Airpower itself is less affected by the cold season. In fact, the British experienced their greatest difficulties in hot and high operations, due to the flimsiness and low power of their aircraft. Despite the fact that “Operations over the mountains along the frontier with Afghanistan were almost constantly hampered by inclement weather,” the British performed creditably in the Third Afghan War.¹⁴ The cold weather immobility of land forces in high mountains is a strategic fact that can be used, if airpower alone is planned to be used and the object is to keep opposing land forces immobile. It can also be used to provide mobility to friendly troops, a technique the Russians frequently practiced.

At the operational and tactical level, aviation weather’s worst effects have been partially offset by technology. Technologies such as SAR allowed the sensors to look through weather. At times, bombs were dropped through clouds, on GPS co-ordinates, with subsequent guidance through ground-based laser designation.¹⁵

Brevity of presence is accentuated in mountains. This effect is directly proportional to the dependency of results on the presence of airpower. Pink’s War relied on continuous harassing effort to enforce the reverse blockade. Since resources for a 24 x 7 presence were insufficient, the British resorted to random timings. When aircraft were used as airborne pickets, the return of aircraft increased the vulnerability of the columns. In such cases they had to rely on immediate air support if attacked. Against the Soviet Mi-24 patrols, the mujahedeen would just cover themselves with their shawls and crouch in the rocks to avoid detection by the searching helicopters.¹⁶ When an AC-130 gunship returned back early from a reconnaissance mission, before the Anaconda ground assault commenced, “the hottest spot in Operation Anaconda had

¹⁴ Omissi, *Airpower and Colonial Control*, p. 9.

¹⁵ Lambeth, *Airpower Against Terror*, p. 257.

¹⁶ Westerman, *The Limits of Soviet Airpower*, p. 5.

just been overlooked.”¹⁷ This spot was to result in the Battle of Takur Ghar. Usually, airpower is “present in concentrated form over a combat zone only intermittently. Of course, helicopters, short takeoff and landing aircraft and gunships can approximate continuous presence *in a permissive air environment*.”¹⁸

This last point about a permissive air environment is important. All three case studies have seen asymmetry of airpower, where control of the air was almost total by one side. The only contested airspace was within ineffective rifle range for British and MANPAD bubble close to the ground in case of the Soviets and Americans. The ramifications of a contested airspace in mountains will be discussed later.

Political boundaries in the air is the last limitation that constrains airpower. This limitation in the context of mountains becomes a problem when operations are being conducted close to borders. The border between Afghanistan and Pakistan was often violated by the Soviet Air Force (VVS) and Afghan Air Force (DRAAF), with an average of 200 violations per year during 1981-1984.¹⁹ In the case of the Kargil conflict, the Indian Air Force operated under strict Rules of Engagement that prohibited crossing of the Line of Control between India and Pakistan, leading to tactical difficulties. Mountains do not present easily determinable boundaries from the air.

Patterns

Theory must translate to practice. The three periods under study show certain common patterns in the application of airpower that can be used to prepare for the future. The next section looks at how conventional air strategy was affected by the mountains, which roles came to the fore, which receded, what importance did training and technology play, and how infrastructure development has affected both land and air warfare. Last, the implications are discussed.

¹⁷ AF/XOL, *Operation Anaconda*, p. 60.

¹⁸ Colin Gray, *Explorations in Strategy*, p. 76.

¹⁹ Thomas Withington, “Night of the Flying Hooligans: Soviet Army Aviation and Air Force Operations during the War in Afghanistan 1979-1989,” in Joel Hayward, *Air Power, Insurgency and the “War on Terror,”* p. 139, at www.airpowerstudies.co.uk/ - accessed 27 December 2011.

Strategic Patterns

In all three cases, commanders turned to airpower as a strategic tool of choice, albeit to similar ends through different means. All three countries used it for two ends, win conventional battles and maintain control. This study emphasizes the former end, through an analysis of battles and operations, while also demonstrating the control aspect to a lesser extent. In the latter Air Control function, it performed well when coupled with political efforts as in Pink's War, to obtain limited aims. However its performance at control in the total British period, the Soviet scorched earth policy, and the post-Enduring Freedom era has fluctuated. As Moreman says, "after the promise displayed during the Third Afghan War, the results of the independent bombing in Waziristan proved disappointing."²⁰ In its conventional role, against a more conventional enemy, airpower contributed exceptionally, exemplified in the Third Afghan War and Operation Enduring Freedom.

And yet there was a sharp learning curve and adaptation in implementation. During the Afghan wars, the British needed lesser adaptation because they had already got used to operating in the mountains from 1916 onwards. The Russians took a year to realize that Afghanistan would turn into a long campaign and bet their future strategy in this terrain on an increase in airpower. By 1984, they began to modify their air and ground strategy. Stephen Blank describes this combined shift as, "moving in the direction of greater reliance upon mobility, long range ordnance from air power, vertical rather than tank led encirclement, [and the] use of specially assigned forces."²¹ In the case of Operation Enduring Freedom, this shift in strategy happened when the planners ran out of conventional target sets after 11 days and air strategy had to be changed.

In all three cases, airpower's conventional kinetic roles were extremely effective only where the target sets suitable to its strategic application were available. The effectiveness of both the British bombing of Kabul, and initial phase of Operation Enduring Freedom in achieving total air superiority, are proof.

²⁰ Moreman, *The Army in India*, p.130.

²¹ Stephen Blank, "Imagining Afghanistan: Lessons of a 'Small' War," *The Journal of Soviet military Studies* 3, no. 3 (September 1990), p. 74 as quoted in Westerman, *The Limits of soviet Air Power*, p.8

The Roles of Airpower

In all three cases, airpower's effective roles shifted towards joint operations in general and to CAS in particular, its least preferred application.²² Slessor, an ardent supporter of joint operations, admits, "*the aeroplane is not a battlefield weapon.*"²³ After the independent Air Control doctrine failed to take hold, Slessor and his generation actively promoted joint operations, in particular CAS suited to mountains. The Soviets, too, shifted to increased joint operations using airpower in all its roles. They honed their valley battle tactics in a classical sequence of intelligence gathering, high-altitude preparatory bombing, airborne command and control, airborne assault, and CAS. The Russians understood "that a combined arms unit operating independently has the best chances of success in a high altitude environment."²⁴ The Americans shifted to CAS in battling for the cities of Afghanistan but forgot the importance of concerted application of the other roles in planning Anaconda in the mountains. This resulted in an extraordinary amount of CAS to make up the deficiencies of preparatory roles of air power. Yet the superior firepower delivered by CAS carried the day. The resulting analysis pinpointed deficiencies in the correct manner of joint planning, and application of airpower in battle plans in the mountains.

As CAS emerged as the role of choice, the role of the FAC grew in importance. For the British, while the role of FAC was not formalized, practical research into the problems of CAS in mountains "indicated the importance of RAF liaison officers at column headquarters to observe and direct operations, as well as an effective means of intercommunications between the aircraft and forward troops and between columns and airfield."²⁵ In application of these lessons, "A senior RAF officer accompanied each column HQ to advise Brigade Commanders, liaise with units and ensure pilots received all necessary information."²⁶ The importance of the FAC in marking the targets was realized then and is even more important now. An important lesson learned was "that it was essential for the forward troops to indicate targets to pilots who otherwise were unable to locate tribesmen exploiting the scrub covered mountainous terrain for

²² Least preferred by Air Forces and most preferred by armies.

²³ J.C Slessor, *Air Power and Armies*, (Tuscaloosa: University of Alabama Press, 2009), pp. 90-91.

²⁴ M. Rahul, "Mountain Warfare Lessons: The Soviet Afghanistan Campaign," Bharat Rakshak Monitor, *Security Review*, Vol. 7, No. 1 at www.bharat-rakshak.com accessed 14 Feb 2010.

²⁵ Moreman, *The Army in India*, p.154. Slessor initiated the exercise to test new concepts in November 1936 and wrote a provisional close-support manual.

²⁶ Moreman, *The Army in India*, p.168.

cover.”²⁷ The Soviet *avianovodchiki* (FACs) were given the nickname of *mayak* (beacon) by the ground commanders. The commanders “grew to value them highly.”²⁸ The capability of the FAC to cue the aircraft to the target was honed during Enduring Freedom, when the Tactical Air Control Party (TACP), “using a hand-held GPS receiver and laser target marker, a GFAC could designate extremely precise aim points.”²⁹ The synergy was made possible by two things: effective communications and effective targeting, both dependent on technology. The importance of the FAC in mountains is a symptom of the requirement of joint targeting.

Mountain warfare causes a role reversal between the man on the ground and the man in the air. As Slessor realized, “in European warfare against large organized armies a function of the air force is to give information about the enemy to the army on the ground, in Frontier warfare it usually had to be the other way round ... the man in the air had to rely on the man on the ground ... to tell him where the enemy was.”³⁰ This lesson has been unchanged, through the Soviet experience to the US one. This reality also gave rise to much debate post-OEF over which was the “supported” component and which was the “supporting” component.³¹

This air-ground synergy also exacerbated the debate on command and control of air assets. The debate is both on who should command the assets as well as how centralized should the control be. Slessor was clear that “authority to call for close support should be vested in the force commander and very rarely delegated to his subordinates.”³² His writings also imply an attempt by the army to command the air assets.³³ In the case of the Soviets, while evidence of this inter-service friction is not available, it is clear that decentralization of air assets, especially of army aviation, mirrored the decentralization of all fighting forces in Afghanistan. As Blank shows, “Moscow experimented with the idea of giving *each level of command* its own airborne and heliborne assets for conducting combined operations.”³⁴ In OEF, the over-centralization of

²⁷ Moreman, *The Army in India* p. 154.

²⁸ McMichael, *Stumbling Bear*, pp. 87-88.

²⁹ Lambeth, *Airpower Against Terror*, p. 259.

³⁰ Slessor, *The Central Blue*, p.121.

³¹ Lieutenant Colonel Michael W. Kometer, *Command in Air War: Centralized Versus Decentralized Control of Combat Airpower*, (Maxwell AFB, AL: Air University Press, 2007), p. 53. Quote by Vice Admiral (retd.) Arthus Cebrowski in *Army Times*, 25 Nov. 2002, “a new air-ground system has come into existence where you no longer talk in terms of one being supported and the other supporting.” The argument is that the air arm was the main weapon, supported by the eyes on the ground.

³² Slessor, *The Central Blue*, p.129

³³ Slessor, *The Central Blue*, p.128

³⁴ Stephen J. Blank, *Operational and Strategic Lessons of the War in Afghanistan, 1979-90*, (Pennsylvania: Strategic Studies Institute, Defense Technical Information Center, September 1991), p. 85

command and decision authority by CENTCOM in Tampa Bay, as opposed to the CAOC at Prince Sultan Air Base, resulted in operational and tactical frictions. Despite the complicated C2 relationships peculiar to OEF, it would be fair to say that command *authority* and *operational control* stayed high up the decision chain, but *tactical control* was often decentralized to the men on the ground (or an airborne FAC). In some ways, this conforms to airpower's doctrinal tenet of "centralized control and decentralized execution."³⁵ While mountains demanded and reshaped forces to achieve this decentralization, it was possible only because of a permissive air environment. A contested air environment would have reduced the decentralization possible, as rapid role shifts would have been required.

The other roles of airpower that have played a major role in effective joint operations in the three campaigns are supply, interdiction, and ISR. The importance of CAS has already been covered. Supply has been the next most important role.

Supply has been the unsung role of airpower in mountains. Its role has been unappreciated, because the more visible kinetic and ISR roles have dominated perception. But it is supply that is the key center of gravity for sustaining mountain troops. Both invasions of Afghanistan have been spearheaded by supply aircraft. The Soviets used 280 transport aircraft in a massive single airlift in December 1979.³⁶ Since they could not use ground convoys to supply outposts, they were supplied by airlift for the larger posts like Khost and Gardez, and airdrops for the remotest ones.³⁷ Helicopters took on a major part of this role, with Mi-8 transport helicopters flying an average of 426 hours per year.³⁸ In December 1928, the Royal Air Force carried out its major airlift when DH9As, stripped of all war equipment, were used to evacuate 586 people and 41 tons of baggage from Kabul to India, due to civil war conditions. They flew in open cockpits in temperatures of minus 20 degrees centigrade.³⁹ ISAF forces continue to use it to date in much

³⁵ Kometer, *Command in Air War*, p.3, 57. The terms are from his book. The interpretation is mine. The C2 issues are covered in detail by both Kometer as well as Lambeth in *Command in Air War* and *Air Power Against Terror*.

³⁶ Lawrence E. Grinter, "The Soviet Invasion of Afghanistan: Its Inevitability and its Consequences," *Parameters*, December 1982, p. 58 as cited in Lt Col Denny R. Nelson, "Soviet Air Power: Tactics and Weapons used in Afghanistan," *Air University Review*, (Jan-Feb, 1985) at

<http://www.airpower.au.af.mil/airchronicles/aureview/1985/jan-feb/nelson.html> accessed 06 March 2012

³⁷ David Isby, "Soviets in Afghanistan Prepared for the Long Haul," *Defence Weekly*, 21 February 1984, p. 14 cited in Nelson, "Soviet Air Power," *Airpower Review*, Jan-Feb 1985 at

www.airpower.maxwell.af.mil/airchronicles/aureview/1985/jan-feb/nelson.htm accessed 06 March 2012.

³⁸ Thomas Withington, "Night of the Flying Hooligans," p. 131.

³⁹ Michael Barthrop, *Afghan Wars and the North-West Frontier 1839-1947*, (Ljubljana: Cassell, 2002), pp. 167-168.

the same manner as did the Soviets. The difficulties of supply in mountains increase the significance of its interdiction.

The importance of *supply interdiction* in mountains is directly proportional to the size and nature of the army interdicted. It affects large armies disproportionately, while being almost inconsequential to small irregular forces. As per Slessor, its effectiveness depends on two things; the ability of airpower to interdict and the ability of the land army to make the enemy expend his supplies.⁴⁰ Yet, there is a third related factor, the ratio of the need of the army to the amount interdicted. This is why the Soviets were so dependent on keeping the supply routes open, while the *mujahideen* were relatively unaffected, despite enormous interdiction by the Soviets. The difference was because the total quantity required by each was so different. What the terrain does is to make supply routes predictable and vulnerable. It is not surprising that Jomini advocated, “in this (mountain) kind of war, more than in any other, operations should be directed upon the communications of the enemy.”⁴¹ In some cases even smaller forces can be disproportionately affected by air supply interdiction. For example, the most effective Indian Air force strike in Kargil was against the supply dump at Muntho Dhalo.

ISR, the very first military role of airpower in any conflict, gains additional importance in mountains. Military airpower's infant steps started with observation.⁴² The same pattern was repeated in the mountains. The very first mission in the Third Afghan War was a three-aircraft reconnaissance into Afghanistan on 6 May 1919.⁴³ The further look reversed the intelligence advantage of the adversary. The mounting of punitive land expeditions were known to the hill men by tracking the movements and logistical buildup of forces, especially as the hill men occupied the high ground. Photo intelligence was introduced in the British era and perfected into the “persistent stare” capability of the Americans.⁴⁴ The ultimate payoff has been not just from the sensors that can see better from further up, but in the data fusing which allows shared battle space awareness both to the ground combatant, as well as the CAOC. IR sensors overcame the limitations of night. But, the one sensor that can overcome the limitations of night, as well as

⁴⁰ Slessor, *Airpower and Armies*, p. 213. He stresses more on interdiction of supplies over force interdiction.

⁴¹ Jomini, *The Art of war*, p. 152.

⁴² Lee Kennet, *The First Air War 1914-1918*, (New York: Simon and Schuster, 1991), pp. 2-3. Interest in observation through balloons started in late 1800s. The next step was artillery spotting and direction.

⁴³ O'Ballance, *Afghan Wars*, p. 59

⁴⁴ Lambeth, *Air Power Against Terror*, p.258.

weather and smoke in mountains, is the Synthetic Aperture Radar (SAR).⁴⁵ Thus, weapon systems which use SAR to target will prove useful. Mountains affect not just air-to-ground surveillance but the air picture, too.

Mountains obstruct radar waves and so force procedural airspace control. Ground-based radars are severely limited by line of sight considerations. Thus, in the absence of an AWACS, in terms of traffic control, most flying happens in an uncontrolled airspace. This leads to procedural control which implies heavy reliance on procedures like altitude de-confliction for safety. This entails delayed response times in targeting. This aspect also explains why A-10s were popular in Afghanistan – these pilots train for, and often execute, procedural control over the airspace in their role as airborne FACs.⁴⁶ While even AWACS are affected by LOS considerations, they are an essential asset in mountain warfare, especially if the airspace is contested.

Casualty evacuation (CASEVAC) has been another effective role in mountains and its burden rests almost entirely on the shoulders of the helicopter fleet. For this reason, it did not play any role in the British era. The Soviets went to great efforts to rescue their soldiers, as did the Americans. The enemy used this knowledge to lure both Soviets and Americans and inflict casualties during the rescue effort.⁴⁷

Some traditional roles of airpower, such as air superiority and strategic bombing, were not as important as in other conflicts. An important reason is the nature of the wars. The three case studies represent asymmetric war in terms of capabilities. We can only extrapolate from scant evidence how important these roles will be if the two adversaries are well matched on ground and in air.

The lack of evidence arises from the fact that matched armies with existing air forces have been reluctant to engage in decisive battles in mountains. As an example, Holmes attributes the narrow channeling of armies in mountains as “the reason why Chile and Argentina have never gone to war.”⁴⁸ The commanders consider the risks of decimation of ground forces too high and incompatible with the gain of objectives. India was reluctant to enter a full-fledged war with China in the 1962 conflict and restrained its Air Force from taking action in the forested mountainous terrain. Three prominent reasons offered for this unexplained restraint, perhaps at

⁴⁵ Lambeth, *Air Power Against Terror*, p.255

⁴⁶ Interview A 10 pilot. 16 March 2012.

⁴⁷ McMichael, *Stumbling Bear*, pp.88-89. In case of Anaconda, most casualties were because of the rescue effort.

⁴⁸ Richard Holmes, *The Oxford Companion to Military History*, (New York: Oxford University Press, 2001), p. 71

the cost of defeat, are first, fear of escalation, second, US diplomatic pressure and third, the army's concern that "since the Indian Army was heavily dependent on air supply, Chinese retaliation could affect the aerial-resupply of our troops."⁴⁹ The Director of Operations of the Air Force "precluded the use of Close Air support against dispersed infantry. Since armour was not likely to be used, there were no worthwhile targets for air attack."⁵⁰ Any extrapolation of the case studies to a symmetric fight in mountains does lead to one conclusion: airpower will tip the balance. This implies that any fight for air superiority in mountainous terrain will become crucial for ground forces. The air defense role is an important component of air superiority.

Mountains increase point defense, not just against land forces, but also strengthen it for air defense too. The efficacy of the rifles of the tribesmen against British aircraft and of Stingers against the Soviets, and the inability of airpower to target them, is one piece of supporting evidence. Even while modern air-ground weapon systems can perform outside this generation of ground-air weapons, it would be fallacy to assume that air defenses will be limited to these primitive methods. While Afghanistan does not provide evidence for symmetrical conflict, the experience in Operation Allied Force in Kosovo during 1999 does to a limited degree. SEAD missions were hampered by an inability to locate defenses. Lambeth explains:

Because of mountainous terrain, the moving target indicator and synthetic aperture radar aboard E-8 JSTARS did not work well at oblique angles, nor did the sensors carried by the U-2 and RC-135 Rivet Joint electronic intelligence aircraft. The cover provided to enemy air defense assets by the interspersed mountains and valleys made for a severe complicating factor in that it allowed defending SAM and AAA units to lay low, set up a trap for unsuspecting NATO aircraft, and then shoot and quickly duck behind a ridgeline and disappear.⁵¹

While point defense is strengthened, the efficacy of area air defense in mountains is questionable. To see any significant distance, fixed radars would have to be sited on top of hilltops. Other options like aerostat radars would be difficult to operate due to restrictions of siting and wind speed. Issues of ground base logistical sustainability, methods of integrating situational awareness, and C2 will pose problems. Satellite communication may be the most efficient data transfer mechanism. The use of AWACS, despite its degraded performance in

⁴⁹ R. Sukumaran, "The 1962 India-China War and Kargil 1999: Restrictions on the Use of Air Power," *Strategic Analysis*, Vol. XXVII No. 30, July–September 2003, p. 3 at www.ciaonet.org/olj/sa/sa_jul03/sa_jul03sur01.html accessed 22 November 2011.

⁵⁰ Sukumaran, "Restrictions on the Use of Air Power," p. 3.

⁵¹ Benjamin S. Lambeth, *The Transformation of American Air Power* (Ithaca, N.Y.: Cornell University Press, 2000), p.198.

mountains, becomes almost mandatory, not just for airspace control, but temporary and local air defense. This is a limitation, for the AWACS is primarily designed as an offensive tool with limited time on station.

Training

Airpower application in mountains requires special training. Whenever this training has been done, it has paid dividends. Slessor experimented with Tactical Exercise Without Troops (TEWT) in November 1936 and its lessons, especially the importance of the liaison officers for ground-to-air synergy, paid immediate dividends in the 1936-37 Waziristan campaign. It also brought home the importance of written doctrine in the form of the *Manual of Frontier Operations and Close Support Tactics*, critical to passing on knowledge.⁵² The Soviet organizational structure, a fallout of its political structure, was rigid and unwilling to learn. The Soviets learned on the job. This resulted in a heavy attritional cost to their operations. Before the introduction of the Blowpipe and Stinger in 1986, the Soviets had already lost approximately 600 aircraft of all types. As one expert guesses, "Certainly, during the first two years of the war, the great majority of the Soviet aircraft losses (75-80 per cent) must be attributed to non-combat losses."⁵³ These losses are the toll that mountains took on the unprepared. It was only after 1986 that the "greatest danger to Soviet pilots was rebel fire."⁵⁴ The American forces at least had experience of warfare, including in the mountainous terrain of Bosnia, and coupled with their technology, needed the least tactical learning. However, the high accident rate while operating in mountains is an indicator of both the increased difficulty level as well as sub-optimal training in mountain flying.

Technology

Technological development has enhanced effectiveness. The British era saw not only the earliest rudimentary technology, but also obsolescence relative to what was available in the European theater. The Bristol was underpowered, short range, without a bombsight, forcing low-level attacks. The de Havilland had an unreliable engine. Air Vice Marshal John Salmond found

⁵² Slessor, *The Central Blue*, pp. 126-127 ; T R Moreman, *The Army in India and Development of Frontier Warfare*, pp. 153-154.

⁵³ McMichael, *Stumbling Bear*, pp. 91, 92.

⁵⁴ McMichael, *Stumbling Bear*, p. 92.

a shortage of supplies and total numbers in an inspection visit in 1922. It was only by 1930 that the contemporary Hawker Hart arrived in sufficient numbers to be “particularly valued on the frontier.”⁵⁵ Much of the army disappointment with the accuracy of airpower was due to the technology of the era. It took much training to bomb accurately. There were no airborne sensors. Air ground communications was with strips of cloth, since wireless technology was limited and cumbersome. The Soviets had state of the art technology, but it was not enough to overcome the peculiarities of the mountains. The best performers were the Mi-24 and SU-25s. The advantages of the SU-25 were its low and slow capability resulting in enhanced accuracy, as well as good endurance.⁵⁶ Laser-guided bombs only came in use in limited numbers towards the end of their occupation. They proved effective, as demonstrated in the three-week battle for the Zhawar cave complexes in April 1986.⁵⁷ The arrival of Stinger technology negated the Soviet air advantage. OEF has seen the most advanced technology, a paradigmatic shift which resulted in enhanced effectiveness. While the most visible effect has been on bombing accuracy, ISR and communications technology deserve as much credit. Deliver of ordnance is now possible much closer to troops.⁵⁸ At the same time, technology allows the targets to be acquired as well as engaged from outside the weapon envelope of MANPADS. This one feature is responsible for the huge difference of casualties between Soviet and US aircraft lost to ground fire.

Innovations

Mountains spawned technological and procedural innovations. The British were forced to adopt low-pressure tires for their Indian Harts to adjust for the advanced airstrips.⁵⁹ They experimented with various weapons, including jerry cans of petrol as bombs. The Soviets introduced Chaff and Flare dispensers, in response to the enhanced Stinger threat. They experimented with various weapons, including chemical weapons as well as airdropped anti-personnel mines. The US developed many specialized weapons to tackle the strength of

⁵⁵ Omissi, *Airpower and Colonial Control*, p. 138, 47, 142.

⁵⁶ The Russian General Staff, *The Soviet Afghan War*, p. 222.

⁵⁷ Edward B. Westerman, *The Limits of Soviet Airpower*, p. 11.

⁵⁸ An AC 130 can fire 40 mm cannon 120 meters from troops, a 105 mm howitzer 200 meters, a 500 lb Mk 82 LGB 425 meters, and a 2000-lb JDAM 500 meters. Compare this to Soviet safe distances ; rockets at 1000 meters, helicopter cannon at 500 meters, and helicopter machine gun at 300 meters. Troops had to be at least 1500 meters away for free fall bombs. Lambeth, *Airpower Against Terror*, p. 259; The Russian General Staff, *The Soviet Afghan War* p. 215; Withington, “Night of the Flying Hooligans,” p. 135.

⁵⁹ Omissi, *Airpower and Colonial Control*, p.144

mountain hideouts. It also innovated in the fields of ISR and data fusion, precision airdrop, and UAS modification. Both the Predator and Global Hawk future specs were modified.

However, it is the procedural, more than the technical type of innovations which indicated a lack of preparation for mountain fighting. Armies recognize the special requirements of mountains and so create mountain or alpine divisions, which are trained and equipped differently. Air Forces do not draw distinctions between geographical elements of applying airpower. This short-sightedness has led to procedural innovations in war. Each of the three countries evolved their operational and tactical art by learning on the job. It took the British almost two decades to gravitate to CAS and the need to develop new procedures to do so. The Soviets went through the same learning curve towards joint operations. The immediate fallout of Operation Anaconda was a Joint Close Air Support Conference held in Kuwait to sort out CAS issues.⁶⁰

Infrastructure

The initial British decision to use road building as a military tool has imperceptibly affected *where* battles have been fought. Road networks both expanded the reach of land forces as well as limited the zones of conflict close to the roads. This in turn affected where airpower was used. While the British effort to build roads achieved its intended purpose to make inroads into inhospitable terrain, it also permanently altered the character and fighting style of the army. From light and mobile columns, armies became heavy and infrastructure dependent. The same tendency was displayed by the Soviets in relying on armor. In the mountains, this armor is limited to travelling on roads. They stayed in and around cities and sent expeditions into the countryside. Since airpower did not work alone, but in conjunction with the army, most large engagements were around road networks. Similarly, most interdiction efforts by the mujahedeen targeted the supply columns travelling on the few roads in Afghanistan. The major battles of the US forces show the same pattern, being concentrated around the major U-shaped road that runs through Afghanistan.⁶¹ The downside of air-ground synergy is that the *reach of airpower gets constrained by the restricted mobility of the landed arm*. Another implication for symmetrical large power conflict is that modern armies are so infrastructure dependent that in mountains an

⁶⁰ Kometer, *Command in Air War*, p. 232

⁶¹ Refer maps at Appendix.

opposing airpower can easily immobilize and then decimate them by destroying the infrastructure.

Implications

Any nation that envisages a war in or through mountains has to prepare differently. This applies to equipping, doctrine, and training. While the first question planners need to ask is the object of the war, the means will depend on the nature of the adversary, conventional or irregular.

The nature of the adversary will affect equipping the most. If the adversary is regular, more attention will need to be paid to control of the air, if irregular, then to ground attack. Against the first kind of adversary, the fight is likely to be short, against the second, longer. Helicopters and dedicated CAS aircraft suited to mountains can only work in a permissive air environment and are essential for the second kind of warfare. The reason is cost of operations. Dedicated CAS aircraft are cheaper than multirole high-end fighters, both in unit as well as operating cost per hour. Low cost, specialized fighters make sense if they are expected to operate for years as in the case of Afghanistan. But for shorter operations, such as OEF proper, a multirole aircraft would be more cost effective in the entire lifecycle cost of the platform. This dictum holds in today's era, when technology has enabled a modern fighter to deliver as much as a dedicated CAS aircraft, from standoff range. In the Soviet era, the accuracy of the SU-25 was only possible due to its ability to fly slow and acquire and track the targets visually from close range. However, for a prolonged irregular conflict, a cheaper aircraft suited for mountain CAS would be both sufficient as well as cost effective. One option is to use training aircraft, which have much of the physical flying characteristics required in mountains. They are slow, safe, and tend to have longer endurance than afterburner-equipped combat aircraft. Their only drawback for mountains tends to be a low thrust-to-weight ratio. If they can be modified to accept modern sensors and weapons, they may prove cost effective by continuing to be utilized for routine peacetime training. While overall helicopters are essential, attack helicopters have proved to have had limited utility in mountains, because of the need of a permissive air environment. They can only operate in the battle zone by taking high casualties. Supply and troop helicopters contribute more, but again, they can operate not in the battle zone, but some distance behind, and

with reduced payload. In the battle zone, the ideal platforms for kinetic effects are fixed-wing aircraft.

The few RPAs that were modified for mountain flying have performed exceptionally well. But the problem is, “very few RPAs are designed to operate at that altitude.”⁶² The Israeli Hermes 1500 and Heron, the Italian Meteor Mirach 150, and the Greek Sigma Nearchos are RPAs with ceilings of between 25000 to 30000 feet.⁶³ The Global Hawk can fly up to 65000 feet.⁶⁴ The smaller RPAs, like micro RPAs developed specifically for the army, are unlikely to have the power or size to reach high ceilings. Militaries interested in mountains will need to invest in high-altitude technology. Not just the platforms, but sensors and weapons that they carry need to be suitable.

Second, doctrine will need to acknowledge mountain fighting as a separate art, not just for land forces, but for air forces too. After two decades of experience, it was only in the 1930s that the British began to acknowledge doctrinally the role of airpower in mountain warfare.⁶⁵ The Russians never did formally reduce their lessons to writing.⁶⁶ The first step to applying airpower differently is to acknowledge that the need exists. Doctrine acknowledges that need. The practical application of this acknowledgement translates to both strategy at the thinker’s level and tactics at the doer’s. Doctrine further translates into procedures and training manuals.

You fight as you train. The problems of both strategists, as well as operators, in mountains were in no small measure a result of inadequate training. Since airpower does not acknowledge geography as a major limitation, its practitioners do not train for mountain wars separately. This is where the shortcomings of practical knowledge translate to increased friction in execution. Anaconda was a watershed event for this reason. The CAS conference post-Anaconda should have been a debrief of an exercise rather than of a real operation. This lesson stands out in short operations, like the Kargil conflict.⁶⁷ The initial learning curve is steep. Every

⁶² K R Singh, “Air-Power Strategy and Ground Support Operations in High Altitude,” *Strategic Analysis*, IDSA, July 2000 (Vol. No. 4), p. 4 at www.ciaonet.org/olj/sa_sajul00sik01.html accessed 22 January 2012

⁶³ Singh, “Air-Power Strategy and Ground Support Operations in High Altitude,” p. 5

⁶⁴ www.theuav.com accessed 18 March 2012.

⁶⁵ Moreman, *The Army in India*, p. 171. This revised edition of *Frontier Warfare (Army and Royal Air Force) 1939* acknowledged as well as explained the role of airpower in frontier warfare, especially the element of air-ground cooperation.

⁶⁶ McMichael, *Stumbling Bear*, pp. 93-96.

⁶⁷ Tipnis, *Operation Safed Sagar*. His account brings out the innovations like using Sony hand held cameras for reconnaissance and hand held GPS for bombing.

operational and technological innovation applied by every Air Force in mountainous war is proof of inadequate training. The lessons should have been learnt in peacetime.

Mountain warfare training presents its own limitations. The first is the availability of mountains for training. Obviously, countries with this terrain are at an advantage. For operators, training flights in mountains needs to encompass both pure flying, as well as practice of operational roles. But it is difficult to construct and operate realistic air-to-ground firing ranges at high altitude, which allow practice of all weapons. Environmental constraints present another difficulty. But, difficult is not impossible. Realistic simulations offer one possibility for training. Tactical practice needs to evolve to the practice of operational art. Because the mountains dictate joint operations, air forces cannot practice in isolation and need to hold joint exercises with mountain troops. The need is even more for naval airpower, which by its very nature operates in a terrain most unlike the mountains – the sea.

Conclusion

This chapter has looked at the three campaigns to see how airpower affects mountains. The initial part of the analysis has been done through the analytical lens of Gray's advantages and limitations of airpower. Mountains do affect each listed attribute. The advantages of *Ubiquity*, the *overhead flank*, *unlimited range and reach*, *speed in mission execution*, and *superior observation*, are increased in mountains. However the advantages of *geographically unrestricted routing* and *flexibility in concentration* are reduced by mountains. Among the limitations, *gravity*, *weather* and *brevity of presence* impose further limits on airpower application. The last point about *sophistication/expense/low numbers* is contextual, and the solutions will vary as per the nature of envisaged war, the adversaries' aerial capability, as well as economic capability of the nation under question.

The second part of the analysis has brought out the patterns that emerge about strategy, the effect of mountains on the roles of airpower, and its ramifications on technology, training, and equipping. Air strategy has needed to adapt after the initial application of airpower. This adaptation cannot be viewed in isolation, but in conjunction with land power. Both have had to move together towards joint application. In joint application, the roles of CAS, ISR and supply, have dominated, especially CAS. While technology has kept increasing the efficacy of airpower

application, friction in application has happened due to inadequate doctrinal emphasis on mountain fighting being different and a resultant lack of training.



CHAPTER 7

CONCLUSION

This study has looked at the effect of mountains on airpower. It started by showing the tactical and operational limitations that altitude, terrain and weather impose on airpower. As its database, it has looked at the history of airpower application from infancy to its adulthood in one geographical area – the mountains of Afghanistan, the NWFP and Waziristan. As the case studies show, both the advantages and limitations of airpower are affected by mountains; and these effects are felt in requirements to modify strategy. However, these advantages and limitations cannot just be compared to airpower's performance over the plains, but always considered by keeping in mind the effect that mountains have on land armies.

Mountains severely restrict land forces. Starting from physiological limitations on the foot soldier, the effects cascade at the operational and strategic levels. Mountains divide forces, retard mobility, obscure awareness, increase dependence on supply, and strengthen point defense, while reducing area defense. No ground commander is comfortable fighting in mountains. And so from the advent of airpower, militaries have turned to it in hope.

The British were the pioneers in using airpower in the mountains of western India, the region bordering Afghanistan. They started operations with a few old aircraft. The Third Afghan War saw airpower play a major role in affecting the outcome. However, its performance in smaller operations was less impressive. There were a few exceptions, Pink's War being one. In such operations, the final result was attainment of limited aims by combined application of air and diplomatic power. Overall, airpower's effectiveness in policing operations remained controversial. This controversy was due to two reasons. First, the effectiveness of airpower was limited by the technology of the day, as well as a small footprint. Second, the bid for independent operations was part of a global bid for Air Control as a substitution for land power, resulting in inter-service rivalry. Thus, the merits of reach and rapidity of response were drowned by controversy on the implications of allowing this new doctrine. By the mid-1930s, the role of airpower settled down to supporting ground operations, with improvements in joint operations effectiveness. This state of affairs continued till the British left in 1947.

The Soviets entered Afghanistan in 1979, planning for a quick exit, but realizing they were stuck for longer, quickly turned to airpower. The initial regime change and move into the country was done by masterful subterfuge, but the subsequent occupation required investing in extra forces. They rapidly built up airpower, while keeping land forces at initial levels. Their doctrine for usage of airpower was largely land-centric. Thus, they used combined operations almost from the beginning. However, their entire military setup was unprepared for mountain fighting. They were forced to reorganize into composite groups, give up static and armor-heavy fighting for more mobile tactics. Airpower allowed this to happen. Airpower supported their offensive sweeps of valleys, helped in patrolling, provided supply, and, in general, provided much needed mobility, especially through air assault. It also independently helped in the scorched earth policy designed to deny logistics bases to the *mujahids*. By the mid-1980s, the Soviets had honed their tactics, with airpower being used in every role possible. However, this doctrine of combined arms, along with the limitations of the technology of the day, resulted in huge losses to ground fire as aircraft operated within ground-threat zones. The arrival of the Stinger, along with a simultaneous political decision to withdraw, saw a reduction in both use and effectiveness of airpower after the mid-1980s.

The US was forced to rely on the strengths of airpower in their pressure for a quick response to the events on 11 September 2011. The initial attack was orchestrated by airpower and supported by rebel Afghan ground troops. The initial air campaign ran out of targets and strategy after day 11. The mountains simply did not offer targets suitable for application of conventional airpower doctrine. Airpower was forced then to target opposing ground forces. This event, coupled with the targeting technology of the day, saw the reversal of the traditional support role. Airpower's effectiveness against small concentrations of enemy troops multiplied, as it was supported by eyes on the ground. Applied jointly, air and land power quickly defeated the incumbent Taliban government. Yet, once again, the occupation proved painful. The US, and later ISAF forces, continue to rely on airpower in both support and kinetic roles towards COIN operations.

These three eras of airpower application show both an evolution, as well as a repetition of some patterns. Mountains affect airpower's advantages and limitations. Some increase in importance while others decrease. The look at the three campaigns does show common patterns.

In mountains, militaries have turned to airpower to overcome the limitations that mountains impose on land armies. Despite the increased restrictions that mountains impose on airpower, airpower has provided that mobility. In every case operations have moved towards joint operations in general and within joint operations, CAS has been the role most employed. It has also been the most controversial. The reason has been an inability to both *locate* and accurately *target* the enemy. Technology has kept reducing these limitations, while airpower has had to rely on land forces to assist it in doing so. At the same time it has assisted land forces in locating enemy forces, supplying friendly forces, and providing them with mobility to outmaneuver the enemy.

Any nation that envisages a war in or through mountains needs both its army, as well as air arm, to acknowledge the effect of mountains. While armies certainly recognize these effects, air forces do not pay sufficient attention to the effects of geography. Not only do air forces need to acknowledge these effects within its domain, at all levels from strategy to tactics, but since joint operations affect both, so do armies in the ways these effects pertain to joint application of force. Both need to acknowledge the requirements of mountain warfare in both air and joint doctrine. The doctrine needs to get translated to how the fighting units are equipped, organized and trained.

One such nation is Afghanistan. Its armed forces are in the process of being rebuilt. Its Air Force is likely to prepare itself for mountain operations. It is also likely that given the situation in the country, apart from conventional war, the Air Force may be employed in various roles from winter supply for isolated pockets of population to anti-drug operations. Its leaders would need to think of the characteristics of the force required to execute envisaged tasks. Whatever the mix of tasks, whatever the emphasis, from air policing to conventional defense, since a major portion of the country is mountainous, the Air Force will need helicopters, ISR assets, short haul transport, as well as CAS specialist aircraft, all suited for mountain operations. The organizing of the armed forces will also need to reflect the immense air ground synergy that the terrain demands. Lastly, training will have to match the equipment, organization and doctrine.

Aviators have traditionally been a haughty breed. They are used to spending solitary hours with their machines, aloof, on top of the world, far removed from its mundane troubles. Everything that seemed important on terra firma becomes so much smaller. In the cockpit, few

things can humble this pride. The mountains can. When you fly at the roof of the world, and still have the impassive peaks of the mighty Himalayas look down on you at Flight Level 200, your perspective changes.¹ The history of air warfare in mountains teaches much the same lessons. The aviator must respect the mountains.



¹ Flight Level 200 corresponds to an altitude of approximately 20000 feet above sea level.

Appendix

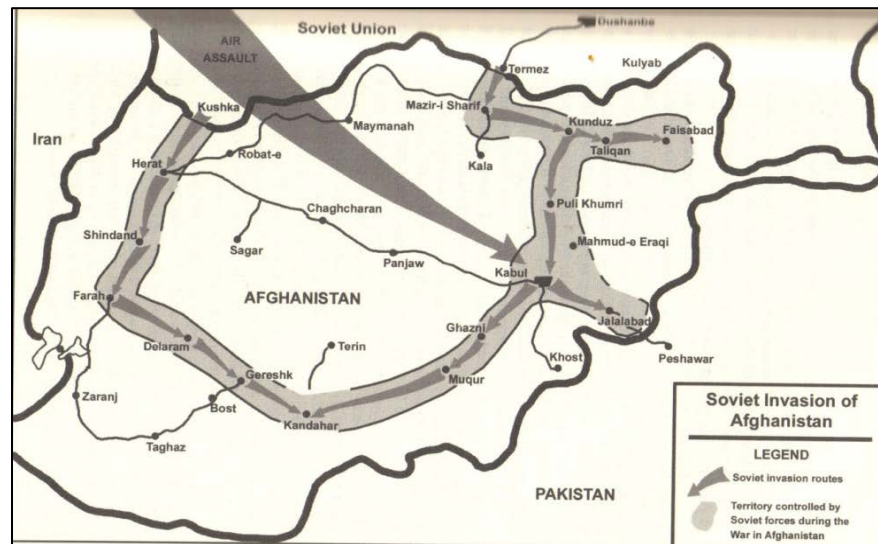


Figure 5: Soviet Region of Influence

Source: Stephen Tanner, *AFGHANISTAN A Military History from Alexander the Great to the Fall of the Taliban*, (Cambridge, MA: De Capo Press, 2002), p. 234.



Figure 6: US Key Engagements

Source: Stephen Biddle, *Afghanistan and the Future of Warfare: Implications for Army and Defense Policy*, (Carlisle PA: Strategic Studies Institute, US Army War College, November 2002), p. 9.

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